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Typical Specifications for Steel Castings

Diversities in Those Governing the Production of Railroad, Industrial and Marine Work—Consumers Growing More Exacting

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All manufacturers of steel castings aim to turn out a product in accordance with pre-determined specifications, whether it be railroad, locomotive, marine, or industrial work. But it is probably little appreciated to what extent the various specifications differ, and to what difficulties and inconveniences producers are put in order to meet them. What follows is intended to show this by examples from the specifications of important buyers of steel castings in this country.

Static or Physical Requirements

Table 1 covers railroad specifications and embraces physical properties of 27 leading railroad companies. There is nothing at all difficult in any one of these specifications for any steel casting producer to meet if his material is thoroughly annealed. Even in the unannealed condition much of the steel will have the above physical properties. There is much more uniformity in these physical specifications as a whole than in some of those described later; nevertheless the variation in extremes is wider than necessary, and the demands of some of the railroads are poor, such as those of railroads Nos. 5, 7, 11 and 27. A specification of the following character could be regarded as standard and adopted by all railroads:

Elastic limit, lb. ½ of T.S.	Tensile strength, lb., minimum 60,000	Elongation in 2 in., per cent. 25	Reduction of area, per cent. 40
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The foregoing table refers only to what is known as "ordinary steel," i.e., 0.25 to 0.30 per cent. carbon. When higher carbon steel is asked for, about the only requirement stipulated is 0.38 to 0.42 per cent. carbon, or a minimum tensile strength of 80,000 lb. per sq. in.

Industrial and Marine Work

When it comes to industrial and marine specifications, the situation is somewhat different. Table 2 will explain this.

Analyzing the data given in this table, the industrials present about the same aspect as those of the railroads, i.e., easy to comply with, and some of them too easy. But in the case of the marine, the situation is more complicated. As high as 75,000 to 77,000 lb. is imposed in some cases, but with a very low ductile requirement, whereas in the case of marines Nos. 4, 5 and 6, a minimum of 65,000 lb. is asked for, and in the case of No. 7 a minimum of 70,000 lb. Individually these present no hardship; but when a producer is called upon to furnish castings for several parties, working under several or all of these marine requirements, with railroad specifications also to meet, unless he has large orders from a single consumer at one time, he must pour all these castings in the one heat. Usually he

Table 1.—Physical Requirements of Railroads

	Elastic limit, lb.	Tensile strength, lb.	Elongation in 2 in., per cent.	Reduction of area, per cent.
Railroad No. 1	None	60,000 to 70,000	22	None
Railroad No. 2	None	60,000 to 70,000	20	None
Railroad No. 3	None	60,000 min.	20	25
Railroad No. 4	None	60,000 min.	20	None
Railroad No. 5	None	60,000 min.	12	None
Railroad No. 6	32,000 min.	70,000 min.	18	25
Railroad No. 7	None	60,000 min.	10	None
Railroad No. 8	½ of T.S.	60,000 min.	22	30
Railroad No. 9	None	62,000 min.	23	30
Railroad No. 10	½ of T.S.	60,000 min.	22	30
Railroad No. 11	None	65,000 min.	15	None
Railroad No. 12	None	60,000 min.	22	None
Railroad No. 13	None	62,000 min.	23	30
Railroad No. 14	None	60,000 min.	22	30
Railroad No. 15	27,000 min.	60,000 min.	22	30
Railroad No. 16	None	60,000 min.	22	35
Railroad No. 17	None	60,000 min.	20	None
Railroad No. 18	27,000 min.	60,000 min.	22	30
Railroad No. 19	None	60,000 min.	22	30
Railroad No. 20	None	None	None	None
Railroad No. 21	None	60,000 min.	20	None
Railroad No. 22	None	60,000 min.	20	None
Railroad No. 23	None	60,000 min.	20	None
Railroad No. 24	27,000 min.	60,000 min.	22	30
Railroad No. 25	½ of T.S.	60,000 min.	22	30
Railroad No. 26	None	60,000 min.	20	None
Railroad No. 27	None	56,000 min.	17	None

will succeed, but there have been many cases where much difficulty and many annoyances were encountered. Here, as in railroad specifications, there is not enough uniformity. A first class marine and industrial specification for mild steel would be about as follows:

Elastic limit, lb. ½ of T.S.	Tensile strength, lb., min. 65,000	Elongation, in 2 in., per cent. 22	Reduction of area, per cent. 40	Cold bend 1x ½ in. 120 deg. min.
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In the case of higher carbon metal, 20 per cent. elonga-

Table 2.—Specifications for Industrial and Marine Castings

	Elastic limit, lb., min.	Tensile strength, lb.	Elongation, per cent.	Reduction of area, per cent.	Cold bend
Indus. No. 1	27,000	60,000 min.	22 in 2 in.	30	None
Indus. No. 2	27,000	60,000 min.	22 in 2 in.	30	None
Indus. No. 3	None	62,000 min.	23 in 2 in.	30	None
Indus. No. 4	None	60,000 to 70,000 min.	15 in 2 in.	None	None
Indus. No. 5	27,000	60,000 min.	22 in 2 in.	30	None
Indus. No. 6	None	65,000 min.	15 in 8 in.	None	None
Marine No. 1	None	60,000 to 75,000	15 in 8 in.	None	90 deg., 1x ¼ in.
Marine No. 2	None	55,000 to 77,000	10 in 4 in.	None	90 deg., 1x ¼ in.
Marine No. 3	None	57,000 to 66,000	20 in 2 in.	None	120 deg., 1x ¼ in.
Marine No. 4	½ of T.S.	65,000 min.	20 in 2 in.	25	120 deg., 1x ½ in.
Marine No. 5	½ of T.S.	65,000 min.	20 in 2 in.	25	120 deg., 1x ½ in.
Marine No. 6	30,000	65,000 min.	25 in 2 in.	30	None
Marine No. 7	31,500	70,000 min.	18 in 2 in.	25	90 deg.

The foregoing all refer to "ordinary" or mild steel. Where a higher carbon is desired, the situation is as follows:

	Elastic limit, lb.	Tensile strength, lb.	Elongation, in 2 in., per cent.	Reduction of area, per cent.	Cold bend
Marine No. 4	40,000	80,000	15 in 2 in.	20	90 deg., 1x ½ in.
Marine No. 5	40,000	80,000	15 in 2 in.	20	90 deg., 1x ½ in.
Marine No. 6	40,000	80,000	20 in 2 in.	25	None

tion in 2 in. on a minimum tensile strength of 80,000 lb. is very hard to meet. A fairer requirement would be:

Elastic limit, lb.	Tensile strength, lb., min.	Elongation, in 2 in., per cent.	Reduction of area, per cent.	Cold bend 1x½ in.
¾ of T.S.	80,000	17	25	90

Vanadium Steel Castings

Not many of the railroads or other consumers have put out specifications covering vanadium steel castings. Those that have appeared are embraced in Table 3.

Table 3.—Vanadium Requirements

	Elastic limit, lb.	Tensile strength, lb., min.	Elongation in 2 in., per cent.	Reduction of area, per cent.	Cold bend
Railroad No. 1	40,000 min.	70,000	20	35	150 deg., 1x½ in.
Railroad No. 2	½ of T.S.	75,000	20	None	None
Railroad No. 3	27,000 min.	60,000	22	None	None
Marine No. 4	40,000 min.	70,000	20	25	100 deg., 1x½ in.

There is nothing difficult in any of the vanadium specifications *per se*; but where a producer is asked to meet all of them in the same heat, he will have difficulty unless he can rely on his metal department to produce steel of a composition within rather narrow limits. To obtain a minimum tensile strength of 75,000 lb., an elongation not less than 22 per cent. in 2 in., and a reduction of area of not less than 35 per cent., is possible only under certain rather limited conditions of chemical composition and heat treatment. There might better be a more uniform specification demanded by all consumers of vanadium steel castings, and the following is suggested:

Elastic limit, per cent.	Tensile strength, lb. min.	Elongation in 2 in., per cent.	Reduction of area, per cent.	Cold bend
59 of T.S.	70,000 min.	22	35	120 deg., min. 1x½ in.
Minimum vanadium content.....				0.16 per cent.

The above is based on an experience covering nearly 600 static tests of annealed, slowly cooled, vanadium steel castings. With proper care it should easily be exceeded in most cases. A much higher tensile strength, with an elastic limit averaging at least 60 per cent. of tensile strength, and an elongation in 2 in. of usually 25 per cent., with a correspondingly higher reduction of area, is more often the case than otherwise. By keeping the tensile requirements to 70,000 lb. per sq. in., one secures the full benefit of the vanadium, for when a higher tensile is aimed at one sacrifices reduction of area and also dynamic qualities.

Throughout the tests here represented the method of heat treatment is the process of slow cooling in a closed annealer.

Chemical Specifications

The chemical requirements for steel castings of the railroad, industrial and ship building interests present rather interesting variations, as Table 4 will show.

It will be seen from the foregoing that individually these are easy to meet; but to put a limit of 0.30 per cent. to the carbon content, as in railroads Nos. 4 and 22, is uncalled for, when some of the best steel casting metal is from 0.30 to 0.35 per cent. carbon. This demand is made by one of the largest railroads in the country. Also in the case of No. 11, a limit of 0.045 per cent. sulphur and in No. 16 a limit of 0.04 per cent. phosphorus, are rather severe for acid open hearth steel. This table refers to acid open hearth steel as well as basic. Regarded as a whole, the chemical specifications are extremely easy because the general practice in open-hearth foundries produces a metal not over 0.045 per cent. in sulphur or 0.040 per cent. in phosphorus, and in many cases, where oil or natural gas is used, lower results are obtained.

The question of the amount of sulphur that is detrimental in a heat of steel castings is also an open one, many being of the opinion that as high a content as 0.05 per cent. to 0.055 per cent. is not harmful. The latest specifications of the United States navy place an upper limit of 0.05 per cent. on steel for castings, which will prove considerable of a

Table 4.—Chemical Requirements

	Sulphur, per cent., not over	Phosphorus, per cent., not over	Carbon, per cent., not over	Manganese, per cent., not over
Railroad No. 1	0.05	0.05	...	...
Railroad No. 2	0.055	0.06	...	...
Railroad No. 3	None	None	...	...
Railroad No. 4	0.05	0.06	0.30	0.75
Railroad No. 5	None	None	...	...
Railroad No. 6	0.05	0.05	...	...
Railroad No. 7	None	None	...	...
Railroad No. 8	0.05	0.05	...	...
Railroad No. 9	0.06	0.06	...	...
Railroad No. 10	0.05	0.05	...	...
Railroad No. 11	0.045	0.075	0.22 to 0.35	0.35 to 0.80
Railroad No. 12	None	None	...	...
Railroad No. 13	0.05	0.05	...	...
Railroad No. 14	None	None	...	...
Railroad No. 15	None	None	...	...
Railroad No. 16	0.05	0.04	...	...
Railroad No. 17	0.055	0.06	...	...
Railroad No. 18	0.05	0.05	...	...
Railroad No. 19	None	None	...	...
Railroad No. 20	None	None	...	...
Railroad No. 21	0.05	0.05	...	...
Railroad No. 22	0.055	0.06	0.30	0.75
Railroad No. 23	0.055	0.06	...	...
Railroad No. 24	0.05	0.05	...	...
Railroad No. 25	0.05	0.05	...	...
Railroad No. 26	None	None	...	...
Industrial No. 1	0.06	0.06	...	...
Industrial No. 2	0.05	0.05	...	...
Industrial No. 3	0.05	0.05	...	...
Industrial No. 4	None	None	...	...
Industrial No. 5	0.05	0.05	...	...
Industrial No. 6	0.05	...	...	...
Marine No. 1	None	None	...	...
Marine No. 2	None	None	...	...
Marine No. 3	None	None	...	...
Marine No. 4	None	0.06	...	...
Marine No. 5	None	0.06	...	...
Marine No. 6	0.05	0.05	...	...
Marine No. 7	0.05	0.05	...	...

hardship for some manufacturers of small steel castings.

It will also be noted from the above table that marine specifications Nos. 4 and 5 have a limit of 0.06 per cent. to the phosphorus content, while the sulphur content is disregarded. There is not one case in a thousand where a producer of first class castings would closely approach a percentage of 0.06 phosphorus. The sulphur content is of far more importance and the two specifications referred to above are for some of the most important work producers are called upon to make. To place a limit to phosphorus content much higher than the average practice produces and to disregard entirely an element such as sulphur are hard to understand, especially when the source of such specifications is the Government itself.

Annealing

Having discussed the physical and chemical specifications, there remain the requirements as to annealing, the castings tested and borings for analysis. In Table 5, these various requirements are tabulated under headings "Annealing," "Physical Tests Required," and "Borings," i.e., whether taken in the presence of the inspector or whether the manufacturer's analysis is accepted, some railroads having their own chemical laboratories for checking their materials.

All United States Government castings, as well as marine, are ordered annealed. The Government takes check analyses from all heats, but the other marine bureaus do

Table 5.—Annealing and Physical Requirements

	Annealing	Frames	Physical tests required—			Borings
			Wheels	Misc. castgs.		
Railroad No. 1	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(a)
Railroad No. 2	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(b)
Railroad No. 3	All castings annealed	Each	Each	2 per heat		(a)
Railroad No. 4	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(b)
Railroad No. 5	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(a)
Railroad No. 6	All castings annealed	Each	2 per heat	2 per heat		(a)
Railroad No. 7	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(a)
Railroad No. 8	All castings annealed	Each	2 per heat	2 per heat		(b)
Railroad No. 9	All castings annealed	Each	Each	2 per heat		(a)
Railroad No. 10	As ordered by Loco. Co.	Each	Each	2 per heat		(a)
Railroad No. 11	All castings annealed	Each	2 per heat	2 per heat		(b)
Railroad No. 12	As ordered by Loco. Co.	Each	Each	2 per heat		(a)
Railroad No. 13	All castings annealed	Each	2 per heat	2 per heat		(a)
Railroad No. 14	All castings annealed	Each	2 per heat	2 per heat		(a)
Railroad No. 15	All castings annealed	Each	2 per heat	2 per heat		(a)
Railroad No. 16	As ordered by Loco. Co.	Each	2 per heat	2 per heat		(a)
Railroad No. 17	As ordered by Loco. Co.	Each	Each	Each over 350 lb.		(b)
Railroad No. 18	As ordered by Loco. Co.	Each	Each	2 per heat		(a)
Railroad No. 19	All castings annealed	Each	Each	2 per heat		(a)
Railroad No. 20	All castings annealed	None	None	None		(a)
Railroad No. 21	All castings annealed	Each	Each	2 per heat		(b)
Railroad No. 22	As ordered by Loco. Co.	Each	Each	2 per heat		(b)
Railroad No. 23	All castings annealed	Each	2 per heat	2 per heat		(a)
Railroad No. 24	All castings annealed	Each	Each	2 per heat		(a)
Railroad No. 25	All castings annealed	Each	Each	2 per heat		(b)
Railroad No. 26	All castings annealed	Each	Each	2 per heat		(a)
Railroad No. 27	All castings annealed	Each	Each	Each over 40 lb.		(a)

(a) Manufacturer's analysis. (b) Taken by inspector.

not. Industrial companies vary as to their demands for annealing, and usually pay no attention to check analyses. The average railroad or other inspector judges the annealing by the fracture of a test bar, or by the color or appearance of the castings. Some attempt to judge these by the fracture of the physical test—a method ordinarily unreliable.

The making of a static test of each driving wheel center is a matter to which there are hardly two sides. The general practice is to place a test bar on each wheel by means of which the annealing is judged when it is detached. Then two of these bars from each heat are tested statically. But there are three or four railroads that insist on a static test from each wheel. Wherever this is carried out, nothing has been gained by either party and the producer has been put to a large additional expense. A test from each frame is reasonable and desirable owing to the importance of the casting. Miscellaneous castings are usually poured with the frames and wheels and carried through by the tests on these. But there are some cases where each miscellaneous casting is tested as in railroads Nos. 17 and 27—an entirely useless operation.

Surface inspection of steel castings is practically a waste of time so far as the purchaser's inspector at the time of shipment is concerned. A producer is not going to ship a casting which he thinks may be returned to him, and an inspector cannot usually detect defects until after the castings are machined. Some inspectors are required to make a careful surface inspection before shipment. This usually results in a waste of time to the producer and the inspector, except in the case of frames and wheel centers. The proper place to inspect all steel castings is at the point where they are machined and put in place.

The question of annealing steel castings is becoming a more important one every day, and it is surprising to what extent specifications vary on this point. There are two general methods of annealing at present in use:

1. Slow cooling in the annealer from a soaking at the proper temperature.
2. Quick cooling in the air from a soaking at the proper temperature.

The microstructure produced in the first case is very coarse while that resulting from the second method is very fine. Which of these methods is the better is a matter of dispute among metallurgists. The latter produces the best physical results in most steels without doubt, though not in all; but the main criticism is whether in castings of unequal section quick cooling does not set up a strain which slow cooling would entirely prevent. Specifications vary on this point, most of them requiring slow cooling, the general stipulation being that the castings "be allowed to cool slowly in the annealer." In the case of anchors, the following annealing requirements are interesting:

"The mass shall be slowly heated to cherry red throughout, and shall be cooled slowly in the heating furnace, the inspector being cognizant of the periods of time taken in each instance. The heat of the annealing furnace shall be gradually raised to 1600 deg. F., 36 hrs. being taken to reach this temperature. The casting shall then soak for 24 hrs. at 1600 deg. F. The furnace shall then be cooled by the gradual shutting off of the heat, 48 hrs. being required for thorough cooling. In all, 108 hrs. For castings of less than 2000 lb. the time in the annealing furnace may be reduced at the discretion of the inspector."

Specifications More Exacting

Every year the inspection of steel castings and the demands of inspectors grow more severe. Not only are the specifications growing more stringent, especially as to annealing, but the demands in other ways are gradually becoming more severe. Not many years ago the Government specifications were feared by many producers, but now the railroads are as exacting as any other purchaser, if not more so. And added to this is the "personal equation," i.e. the characteristics of the inspector himself, whether acting for different purchasers or for the same one, for in many cases the same specifications are variously interpreted, and to an extent that is surprising.

The whole question could be simplified were there a greater uniformity in the demands of the general users of steel castings, both physically, chemically, and in annealing. Why should not specifications be standardized? The nearest approach to an answer to this question is the Standard Specification for Steel Castings adopted by the

American Society for Testing Materials, June 1, 1912. In these, the slow method of cooling is stipulated in the annealing. The physical requirements are worth quoting here as being fair, up to date, and of standard worth:

	Hard	Medium	Soft
Tensile strength, lbs., per sq. in.	80,000	70,000	60,000
Yield point, lb., per sq. in.	36,000	31,500	27,000
Elongation in 2 in., per cent.	15	18	22
Reduction of area	20	25	30
Cold bend, 1 x 1/2 in.		90 deg.	120 deg.

Only one tension or bend test is asked for from each melt or heat. This is more reasonable than requiring a test of 50 to 100 per cent. of all the castings entering into the construction of a locomotive, and will prove as effective in results, protecting the consumer adequately as well as benefiting the producer.

A Booklet on Rail Steel

The Titanium Alloy Mfg. Company has just issued an elaborate booklet entitled "Rail Reports, Bulletin No. 1." The purpose is the presentation of a series of rail steel studies, both in service and in the laboratory. These embrace comparative tests of standard carbon rails and rails of the same general composition treated with titanium. The first bulletin deals with results of complete tests for one set of the five samples of standard and titanium-treated open-hearth rails, which have been sent to the company's laboratories from three different railroad systems since January 1, 1913, demonstrating the effect of titanium. The tests embrace chemical, physical, bending, hardness, impact resistance, and endurance tests on both the White-Souther and the Landgraf-Turner machines from the head, web and flange of the rails. Comparative sulphur prints of the ends of the rails and excellent photomicrographs from the head, web and flange are included.

An analysis of the results points to beneficial effects from a proper addition of the ferro carbon titanium. Segregation of the chemical elements is lessened, as shown by analysis and by hardness tests; the average hardness is increased, due to greater homogeneity; the ductility is increased without materially sacrificing the tensile strength; the figures for impact and bending resistance are higher; and the dynamic resistance is greater, especially in the web and flange, again demonstrating a diminished segregation. Bulletins embracing reports on the other sets of rails are announced to appear later.

Quick Computation of Weights of Bars

To find the weight of square or flat iron or steel bars, multiply the sectional area of the bar by 10/3, which will give the weight in pounds per lineal foot. Add 2 per cent. for steel. For example in the case of an iron bar 1 1/2 x 1/2 in.:

$$3/2 \times 1/2 \times 10/3 = 5/2 \text{ or } 2 1/2 \text{ lb. per lineal foot.}$$

$$\text{For steel, add } 5/100 = 2.55 \text{ lb. per lineal foot.}$$

In the case of round steel bars, to find the weight per lineal foot, divide the square of the number of quarters of an inch in diameter by 6. For example, in the case of a steel bar 3/4 in. in diameter:

$$3 \text{ squared (there being 3 quarters)} = 9 \div 6 = 1 1/2 \text{ lb. per lineal ft.}$$

These short methods are useful when a handbook is not at one's elbow.

Canadian Magnetic Iron Sands.—G. C. Mackenzie, in a report issued by the Canadian Department of Mines, gives an account of his investigation of the magnetic iron sands of Natashkwan, Quebec, of which there are deposits at various points along the north shore of the lower St. Lawrence River and gulf. In their native condition they are unfit for the production of iron and can be made so only by concentration. The best means of accomplishing this has been demonstrated to be the wet magnetic separator of the Gröndal type. Crude sand containing 14.7 per cent. iron and 4.43 per cent. titanic acid can be concentrated to a product containing 70.4 per cent. iron and 1.7 per cent. titanic acid, recovering, however, only about 45 per cent. of the original iron. Better adjustment of the separators and closer attention to details are thought likely to improve these figures. Details are given of a plant and process suitable for carrying out the process on a paying basis.

Improved Smoke Prevention Device

Control of the Air and Steam Supply
by Fire Door Movement a Feature

Under patents granted to W. C. Beam, the Rockford Smoke Prevention Company, Rockford, Ill., is manufacturing a smoke preventer for furnaces which automatically operates to feed a charge of steam and air to a furnace. The device provides for the automatic regulation and

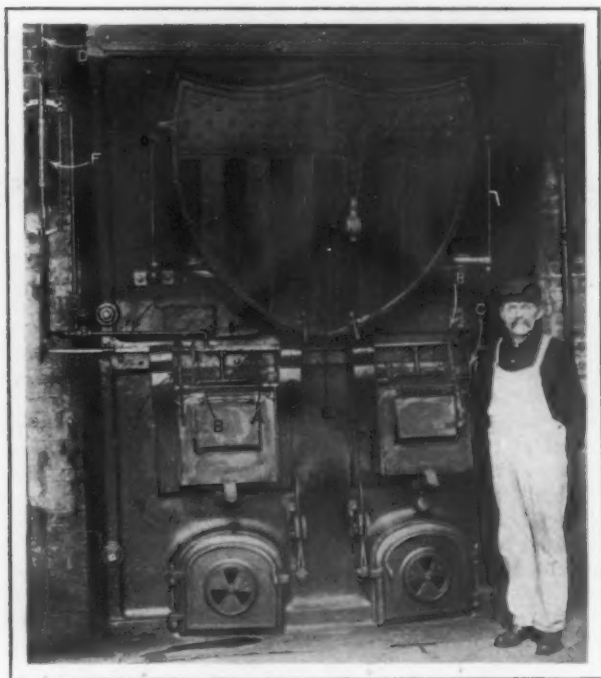


Fig. 1—An Improved Device for Preventing Smoke Applied to a Boiler

proper feeding of air to a fire and the charging of the hydrocarbon gases resulting from combustion with steam to prevent improper combustion and the resulting smoke. Two of the features of the device are an improved form of regulator for controlling the smoke-preventing apparatus, and the provision of a door liner or deflector to co-operate with the steam jets to secure the passage of air to combine with the charge of steam from these jets. Fig. 1 shows the device applied to a boiler, while a detailed view of the apparatus showing the arrangement of the various parts is given in Fig. 2.

The furnace to which this device is applied is of the ordinary type, with all of the customary parts. A rocker shaft, A, Fig. 1, is mounted in brackets fastened to the furnace face and carries fixed arms B. These have a chain connection with the doors covering the air openings in the fire doors. This shaft is adapted to be rocked through arms having a link connection C with the rocker shaft, the arms being actuated through the contact of the opening of the fire doors. Steam is supplied through the main pipe D, which has a control valve located upon it. This steam supply passes through a cross-head, E, from which pipe sections lead to the fire opening and have discharge jets at their ends, which charge steam over the length of the fire.

The rocker shaft, steam valve and damper are connected with a time-regulating device carried at the face of the furnace. This regulator is in the form of a cylinder, F, Fig. 1, a, Fig. 2, which is fastened to the furnace face by brackets. It has a closed bottom and a detachable top with a central opening, b, and a filling plug, c, which has an air vent. A piston head, d, is reciprocated within the cylinder by a tubular piston rod, which in turn is actuated through its cross-head connection e through a link and arm from the rocker shaft A, Fig. 1. The piston has a recessed bottom, f, Fig. 2, forming a valve seat and a cylindrical opening contained within the seat. This opening extends longitudinally through the piston, and communicates with the cylinder chamber. Spaced pairs of lugs g depend from the cylinder head, and serve as

rests in contact with the cylinder bottom to limit the downward movement of the piston. A rod, h, having an adjusting head, i, is carried slidably in the piston rod and is held in an operative position by a coiled spring. The lower end of the rod has a movable end, j, connected to it by the universal joint k, and in an adjustable screw connection with this rod end is a valve, l, which is held upon the valve seat by the action of a spring. This valve is formed with extending arms m, interposed between the lugs g. It is limited in this way from radial displacement and also from vertical displacement by cotter pins. A tapered opening, n, in which the tapered end of the rod j is located forms an adjustable needle valve, an opening, o, leading from the needle valve opening n to the opening in the valve seat. A by-pass, p, leads from the bottom of the cylinder chamber to a point above the piston head. The cross-head e has an upwardly extending arm, q, with a yoked end straddling the steam pipe to maintain the cross-head from lateral displacement. A by-pass lever, r, is pivotally carried by the arm q and rests on the end of the rod h, and when downward pressure is applied to this lever the valve l will be unseated. The steam control valve is connected to the cross-head by a lever, s.

A door liner or deflector is carried at the inner side of the fire door and has an open face adjacent to the opening for the air door. Inwardly extending deflector walls comprise the side and back walls, which have vent openings therein. As the back wall extends inwardly beyond the steam discharge jet, an air passage is formed which leads directly to these jets. In this way the door liner performs the double function of deflecting the heat of the furnace from the operator when the door is opened and also forming an air conduit to the steam jets. This latter function allows a fresh charge of air to mingle and inter-mix with a charge of steam and become diffused over the volatile gases.

The regulator operates by the passage of some liquid such as oil through its valves. The cylinder chamber is filled with this liquid to the height of the upper bracket. In Fig. 2 the regulator is shown in its inoperative position, and when either fire door is opened the motion will be transmitted to the rock shaft A, Fig. 1, and in this way raise the piston in the cylinder through the cross-head connection. This movement operates the damper to increase the draft to the fire and opens the steam control valve, permitting the steam to be discharged from the jets into the fire as well as

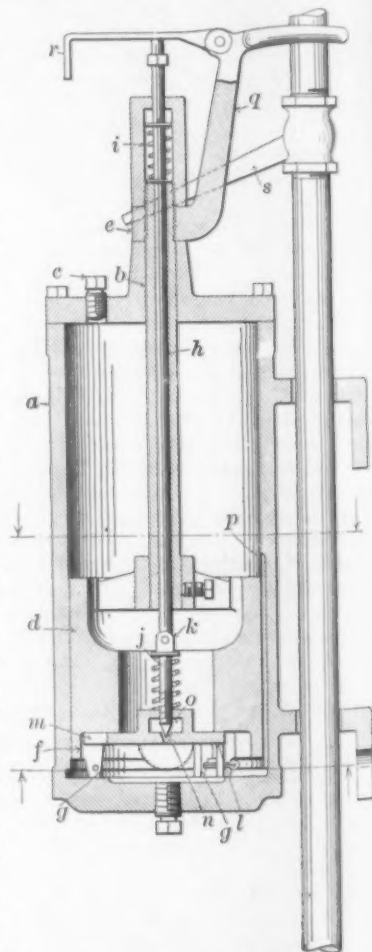


Fig. 2—Detail View of the Apparatus Showing the Arrangement of the Various Parts

opening the doors to allow fresh air to be drawn in and mixed with the steam charge. As the piston rises, the oil contained above it will pass through the valve, l, Fig. 2, which is opened by the weight of the oil. When the fire has been charged with coal and the door is closed, the weight of the operating parts will cause

the piston to descend and the valve will be seated, and the oil will pass upward through the valve *n*, thus giving a slow descent to the piston. During the time required for the piston to descend, the steam and air charges upon the fire accomplish their purpose, and as the piston reaches the end of its descent the oil in the bottom will pass upward quickly through the by-pass *p*, thus giving the piston a quick final movement to shut off the steam supply. By the screw adjustment of the rod *h*, the degree of opening of the needle valve may be varied, and the length of time required for the piston to descend changed. When the piston is at the upper end of its travel and it is desired to have it dropped quickly to an inoperative position, the by-pass lever *r* is pulled down, thus unseating the valve *l* and permitting the oil to pass upward.

A 3-Ft. Heavy Radial Drilling Machine

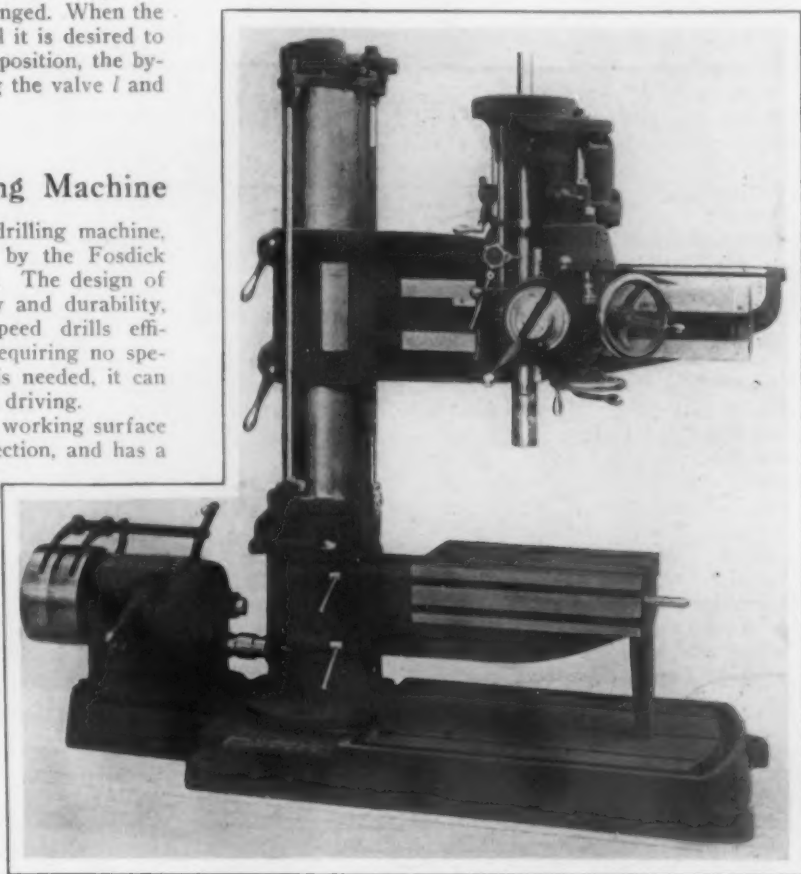
A new pattern of heavy duty radial drilling machine, with a 3-ft. arm, has been brought out by the Fosdick Machine Tool Company, Cincinnati, Ohio. The design of the machine combines simplicity, accuracy and durability, with sufficient power to handle high-speed drills efficiently. The machine is self-contained, requiring no special foundation, and, as no countershaft is needed, it can be placed directly under the lineshaft for driving.

The base is very deep, 6 in., and has a working surface of 30 x 41½ in. It is of triple I-beam section, and has a number of extra large T-slots. An oil channel cast around the base drains into a large reservoir under the column, which is of the double tubular type and is 10 in. in diameter. The fixed inner column, which is reinforced by ribbing, extends entirely to the top, where a large ball thrust bearing insures easy swinging of the arm.

The arm is of pipe section with an 8½-in. face and is reinforced in both directions to give resistance to torsional and bending strains. Adjustable screws are provided for the tighteners, the purpose of these being to prevent sagging and provide a means for taking up wear. The elevating screw for moving the arm through its traverse on the column of 27½ in. is suspended by a ball thrust bearing. The arm lowers at twice the elevating speed, its movement being controlled by a conveniently placed handle, and safety trips are provided for both extremes of travel. A rack and spiral and pinion move the head along the arm for 28¾ in. to give a maximum distance between the spindle and the column of 38¾ in., the thrust in either direction being taken up by a ball bearing. The direction and speed of motion of the head is controlled by a large handwheel. Three speed changes are provided by the back gears on the head, through hardened steel gears and clutches, and changes from one speed to another can be made while the machine is running by manipulating a single lever in front of the head. The gears, all of which are incased, are placed between the spindle and the friction, an arrangement which it is emphasized gives the friction the benefit of the back gear ratio for the heaviest kind of work. The tapping reverse frictions, which are claimed to be simple and at the same time very powerful, are mounted on a sleeve which slides on the arm shaft. In this way, no grit can be drawn into the mechanism, which is inclosed and runs in oil. The adjustment for wear is made from the outside with an ordinary screw driver.

Crucible steel is used for the spindle, which is 1 11/16 in. in diameter and is fitted with a No. 4 Morse taper. The thrust is taken on a special ball bearing. The sleeve has a direct reading depth gauge and the adjustable automatic trip may be set to the exact depth of the hole in any position. A positive acting safety trip is provided at the extreme limits of the 12-in. spindle travel. The quick return friction is operated by a double lever, and can be instantly adjusted. Any one of the five feed changes ranging from 0.007 to 0.031 in. per revolution of the spindle can be made while the machine is running, the engagement of the feeds being controlled by a single

handle with a direct reading index. The feed box is placed low on the head to provide support for both sides of the worm. The worm wheel is inclosed and runs in an oil bath. An overtake clutch enables the hand feed to be engaged before the power feed without disengaging the latter. The speed box has a direct reading index plate for the positions of the lever. All of the 18 changes, ranging from 25 to 400 r.p.m., can be made easily and without noise by a single lever. The use of an overtake



A New 3-Ft. Heavy Duty Radial Drilling Machine

arrangement which keeps the machine running at a reduced speed when the tumbler is out of engagement, it is emphasized, avoids shock. A latch pin secures the cylinder and prevents chattering when heavy work is being handled.

A complete lubricating system, including oil chambers, wipers or pipes, according to the location of the various parts, is provided, and the bearings are of phosphor bronze.

If desired, motor drive may be added to the machine at any time without requiring a special base. Constant-speed or adjustable-speed motors, having a range of 3 to 1 and developing between 3 and 5 hp. can be used, the power being transmitted through rawhide gearing or silent chains. A number of different types of tables can be supplied. These include a plain swinging box table; a plain swiveling table, with or without a round table, and a worm swiveling table, also with or without the round table.

A New Method of Testing Hardness.—A new device for testing the hardness of steel by impact has recently been invented. A tubular standard, fitted with a hardened steel ball at the lower end, is placed on the steel to be tested. There is a spirit level at the upper end of the standard by which the latter can be brought to a true vertical position. Mounted on the standard is a cylindrical drop weight. By raising this to the top and dropping it, thereby striking a weight-receiving block at the bottom of the standard, an impact is communicated to the steel ball which makes an indentation in the steel to be tested, similar to that produced by hydraulic pressure with the Brinell machine. The hardness of the steel is determined by measuring the diameter of the indentation with a celluloid scale.

Massive Norton Roll Grinding Machine

A New Single Wheel Type Handling
Work up to 54 In. in Diameter and 21 Ft.
Between Centers and Weighing 50 Tons

The Norton Grinding Company, Worcester, Mass., has designed and built a massive cylindrical grinding machine to swing 54 in. in diameter. The machine, shown in detail in the illustrations, grinds work 18 ft. in length and has a capacity of 21 ft. between centers. It is equipped especially for grinding heavy rolls, but can be supplied without this equipment and, consequently, is suitable for grinding plain cylindrical work on centers. It will be built with any desired length between centers.

The machine is motor driven throughout. The motor equipment consists of five motors: a 40-hp. unit mounted on the wheel carriage for revolving the grinding wheel and traversing the wheel carriage, a 15-hp. motor located on the headstock for revolving the work and three 2-hp. units. These small motors are placed on the head and footstocks and on the wheel carriage. The first two are employed for traversing the parts upon which they are mounted along the ways of the work base, while the last drives the pump and traverses the grinding wheel at right angles to the work. The machine is controlled from one position, at which the operator has full observation of the grinding process. The rolls may be rotated either between centers or, when the necks are to be ground, on specially constructed adjustable bearings. Ample ranges of speed of revolution of the work and of the traverse of wheel are provided. The machine is believed to be the heaviest of its class ever constructed, its weight being 100,000 lb.

The machine is controlled from one position. The operator stands upon the wheel carriage beside the grinding wheel and looks directly down between the face of the grinding wheel and the face of the work which is being ground, so that he can see what is taking place at the point of contact. Within his reach are all the handwheels and levers necessary for starting and stopping the wheel, starting or stopping the roll, reversing the traversing wheel carriage either by hand or by power, moving the wheel carriage for delicate adjustments by hand, moving the wheel toward and away from the work either by hand or by power, starting or stopping the traverse of the wheel carriage, changing from the maximum to the minimum speed of wheel carriage traverse and controlling the amount of water or lubricant flowing over the wheel and work.

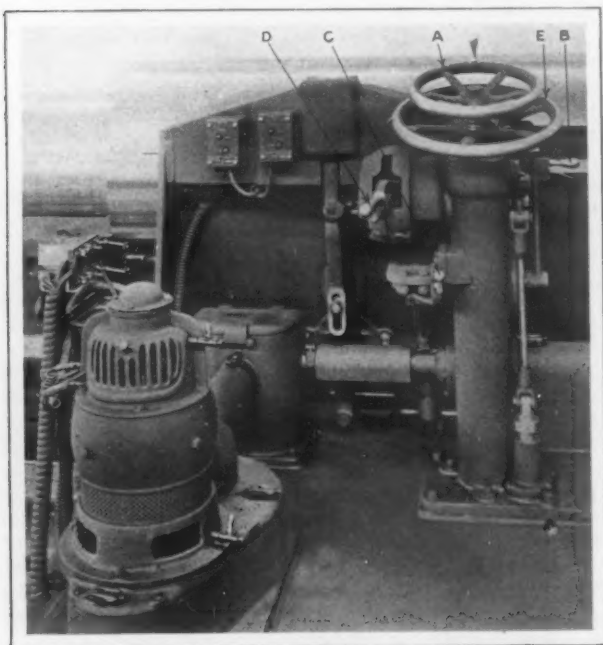


Fig. 1—The Wheel Carriage and the Control Mechanism

The upper handwheel A, Fig. 1, feeds the grinding wheel toward and away from the work, one revolution of the handwheel moving the grinding wheel a distance of 0.040 in., corresponding to a 0.080-in. reduction in the diameter of work. If the wheel is to be moved by power the handwheel is disengaged by moving the lever B toward the operator and locking it in this position. This raises the handwheel, disengaging it from the wheel feeding mechanism and at the same time releases the wheel traverse lever C, the movement of which to the right or left operates a clutch, resulting in a feeding of the grinding wheel either toward or away from the work. These levers are so constructed that the power traverse cannot be thrown in until the handwheel has been disengaged; nor can the handwheel be engaged until the power traverse levers have been thrown out of engagement. The lever D controls the stopping, starting and reversing of the wheel carriage. When automatic traverse of the carriage is desired, the lever is placed in its lowest position. In the intermediate position the wheel carriage can be reversed or stopped by hand. In its upper position the lever engages the lower handwheel carriage traverse mechanism, permitting the movement of the wheel carriage by hand.

The changes in speed of work revolution are accomplished at the headstock with change gears. The seven speed changes for the traverse of the wheel carriage are made on the front of the carriage by the lever F, Fig. 2. With back gears 13 changes are obtained.

As the machine is designed for very large work, it is imperative that the ways in which the wheel carriage travels be perfectly straight. To obtain this result the Norton pendulumeter is used. The instrument permits the detection at any point of errors as small as 0.0001 in. in parallelism and straightness of the ways, which are scraped to master straight edges until a perfectly straight line is registered.

Supporting wedges are self-contained with the machine, and the alignment of the ways can be corrected at any time, but with so ample a width and length of bearing of the wheel carriage it is highly improbable that with the machine once set up and adjusted for correct alignment any error can be detected after many years of use.

The double wheel machine with a swinging frame to secure accurate diameters over the entire length of the roll was invented by J. Morton Poole years ago. At that time no methods were known for producing and maintaining straight ways of sufficient accuracy to secure perfectly straight lines or uniform diameter of roll with a single grinding wheel. The machine described is designed in accordance with the experience of recent years. Today it is wholly practicable to produce and maintain ways for a single grinding wheel which will secure perfect rolls, while incidentally the advantage of the single wheel is that it is feasible to have the wheel large in diameter and of wide face, so mounted and provided with powerful drive as to permit the grinding in a few hours of rolls which formerly required a day or even days. Furthermore, it is more convenient to place heavy rolls in the machine, or to remove them, where the single wheel is employed.

Under the old system a roughing cut was unknown. All cuts were practically finishing ones, and hours, in fact days, were spent in the slow process of grinding with small wheels, not exceeding 14 or 15 in. in diameter and not over 1 or 2 in. in width, with relatively small spindles and frail supports.

The two objects in view in designing the machine have been accuracy and large production. The older line of double wheel grinding machines have produced accuracy at the expense of time. With this single wheel machine advantage can be taken of greater weight and power, securing accuracy and at the same time rapid manufacture.

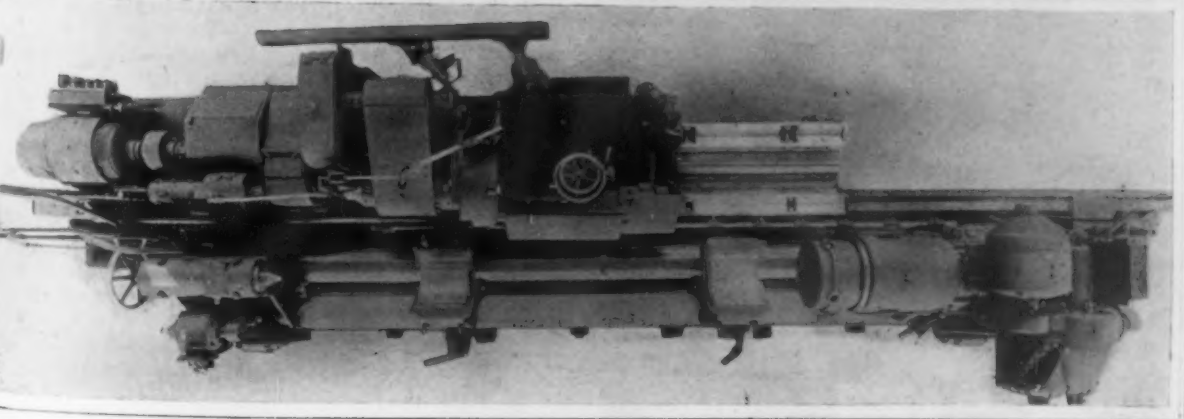
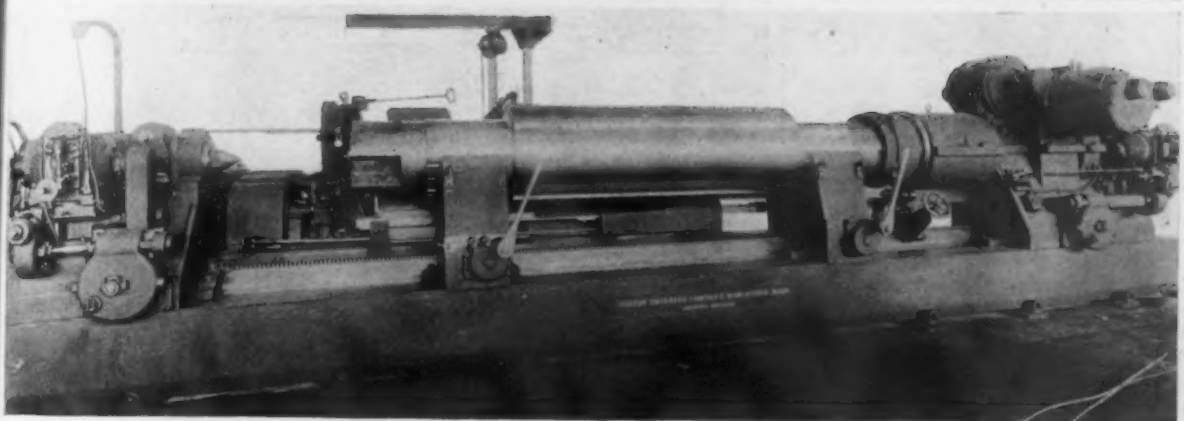
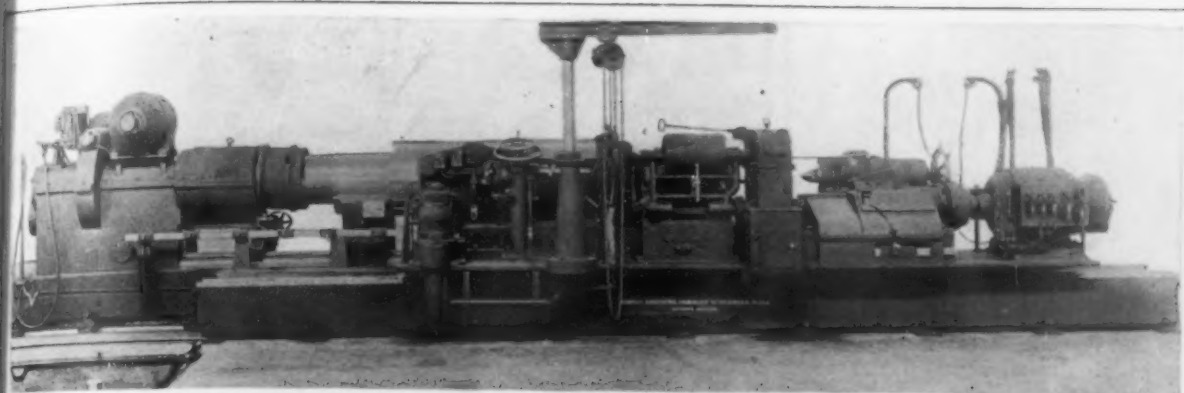


Fig. 2—The Roll on the Pillow Block Bearings in Position for Grinding

Fig. 3—Rear View of the Machine with the Roll in Position

Fig. 4—Rear View with the Roll Removed from the Bearings

Fig. 5—Plan View of the Roll Grinding Machine

VIEWS OF THE NEW NORTON 54-IN. ROLL GRINDING MACHINE

The first roll grinding machine of the new type was shipped to a well-known steel mill for grinding rolls to be used in the manufacture of steel plate. They are of various diameters and lengths, but the largest roll the customer expects to grind is 34 in. in diameter and 18 ft. in length over all, although 54-in. rolls can be ground if desired. The machine is equipped with massive pillow blocks and bearings for carrying the rolls upon their necks, the largest of these necks being 24 in. in diameter.

During the demonstration rolls were ground in from one-fourth to one-half the time previously required for finishing them in the lathe. Sufficient time has not elapsed in which to establish definitely the conditions under which the machine will give the greatest output, but there is every reason to expect that greater savings will be shown after it has been in commission longer.

The original design of Norton plain grinding machines has been departed from in this case for the reason that the work to be ground is of such size that in order to see the point of contact between the work and the wheel it is necessary for the operator to have control of the machine on the side of the work where the wheel is grinding. As in the standard machine, however, he has entire control of all of the important functions of the machine from one position and without reaching over the work. To secure perfectly smooth work the rolls are revolved through helical gears and a large worm and worm wheel running in a bath of oil. Six speeds of work revolution are provided. The headstock spindle is 12 in. in diameter and the footstock spindle is 10 in. in diameter. The centers are 6 in. in diameter and are interchangeable.

When grinding rolls are carried on their necks they are revolved by a large universal joint, G, Fig. 6, to give a steady and uniform rotation, one end of the joint being bolted to the face plate of the headstock spindle. To the other end is bolted a driving sleeve, H, which clamps solidly to the wabbler end of the roll, revolving as a part of it. The handwheel I raises and lowers the sleeve, and the V-shaped rolls J maintain it in position and permit it to be revolved when putting it in a position to slide over the end of the roll. When grinding work on centers the

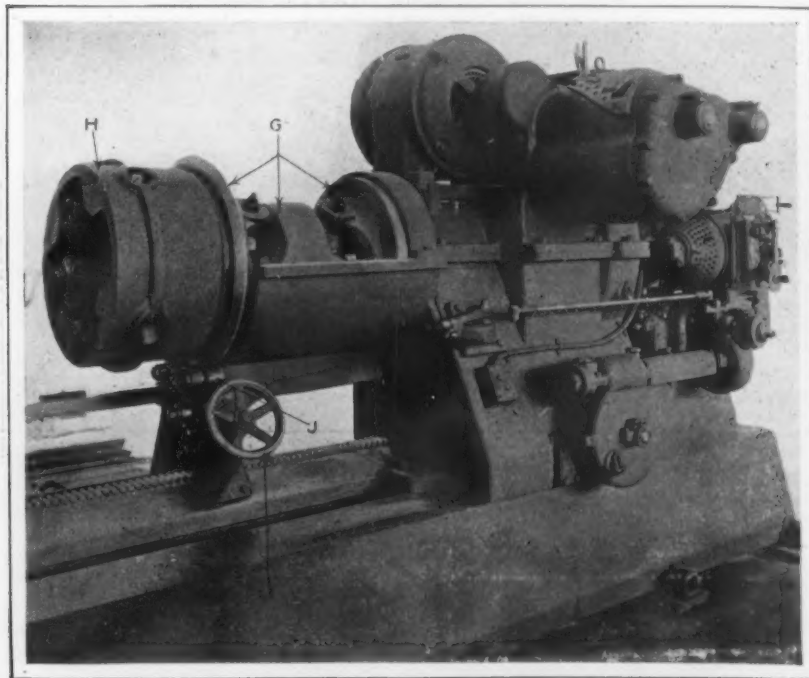


Fig. 6—The Headstock with Its Universal Joint Locator and Driving Sleeve

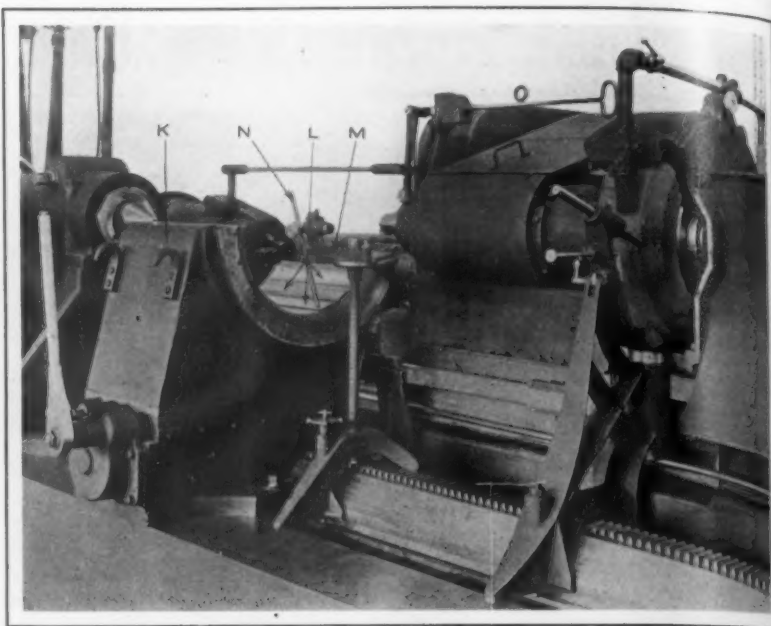


Fig. 7—The Pillow Block Bearings with Trammel for Setting the Bronze Sleeves for Corner Diameter and Radial Truing Device for Shaping the Corner of the Grinding Wheel for Grinding Fillets

universal joint, its case and driving sleeve are removed and a driver is bolted direct to the face plate on the headstock spindle. The sleeve and joint are steel castings.

The wheel head, with its spindle, wheel guard, wheel sleeve and wheel, weighs over 5000 lb. and rests upon a solid wheel head base mounted on the long heavy traversing wheel carriage, making it possible to grind the rolls rapidly. Provision is made for grinding the necks of the rolls either when carried on the machine centers or when the rolls are revolved upon their necks in specially arranged bearings. The machine can be supplied either with or without the footstock, which is unnecessary in grinding the neck, as it is entirely practicable to grind rolls both on necks and body when they are carried in the bearings of the pillow blocks K, Fig. 7, which are provided with multiple bronze shoes L. These are adjustable for the small variations from the standard in the size of necks, a pillow block being required for each size. The bronze shoes are adjusted by the screws. The mechanism for locating the shoes to fit the work is seen at M. It carries the rod N, which is so graduated that it can be set at the correct radius for a roll neck. By revolving it about the pivot, which has the same center as the work, the shoes can be brought into an arc of a circle of the desired diameter. Perfectly round necks are guaranteed whether or not there are centers in the roll. Fillets on the roll necks can be ground with the same wheel and at the same time as the necks. A forming attachment is also provided, which is adjustable for any radius for the forming of the corner of the grinding wheel for use on fillets. A truing device maintains the face of the grinding wheels. The pump delivers about 30 gal. of lubricant per min. on the wheel and work.

The castings of this machine contain about 20 per cent. steel, giving a close grain casting. The wheel spindle is of chrome nickel vanadium steel, heat treated to a hardness which gives it special wearing qualities. The grinding wheel sleeve is a steel casting, as is also the wheel guard, which weighs over 600 lb. The shafts are finished by grinding. The worm and worm wheel are made by the Brown & Sharpe Mfg. Company. Helical gears in the headstock are of steel, as are also many of the other gears in the machine at

points where strength and durability are required. All racks are of solid steel. The pillow blocks for the roll necks are steel castings, while their adjustable bronze bearings are of the best material obtainable. The adjust-

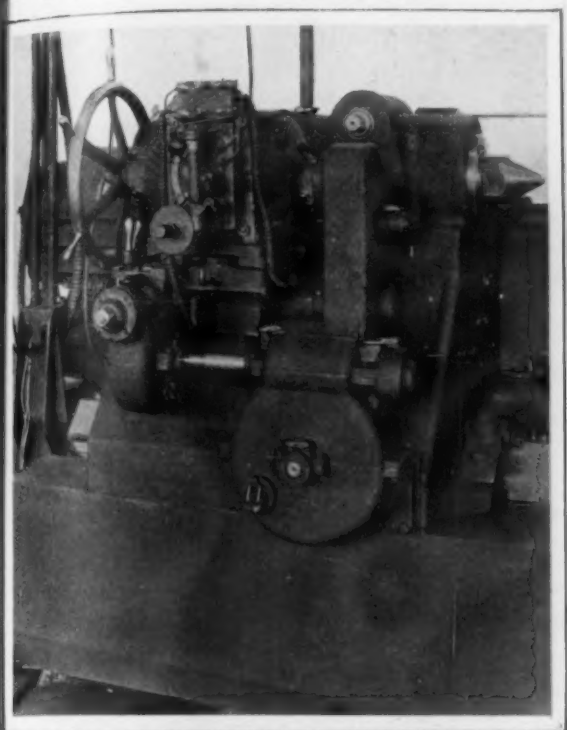


Fig. 8—The Footstock of the Machine

ing wedges under these bearings are of high-carbon steel. All bearings, where necessary, are self-oiling. All oil holes are covered with a small iron cap which cannot easily be broken off, but is easily seen by the operator.

When desired, an attachment can be supplied for this machine which will permit the grinding of rolls with either a concave or convex face. The machine as shown in the illustrations is arranged for grinding rolls either straight or with straight tapers, whether or not the rolls are carried on centers when being ground.

Steel Castings or Forgings for Gun Yokes?

According to a paper by General L. Cubillo, Madrid, read before the Association Technique de Fonderie in Paris recently, the steel foundry of the Nationalfabrik von Trubia, Spain, has developed excellently. This plant not only takes care of the mechanical fabrication of guns, gun carriages and shells, but includes also a large melting plant, a forge department and a complete outfit for hardening and treating large and small pieces for the ordnance equipment. The melting department consists of two furnaces of 50 and 16 tons capacity, respectively, from which ingots or castings up to 60 tons are poured. The forging department includes two presses, one of 3000 tons and one of 1200 tons, each served by soaking pits. The heat-treating arrangements embrace two vertical receptacles for large, medium and small guns. The steel foundry produces gun carriage and other heavy pieces. The author recalled that Pourcel 30 years ago showed that it was possible to make gun yokes from steel castings. Up to the present the government prefers forgings. The process of doubly hardening these castings is successfully carried out in the Swedish works at Bofors, which has recently produced 21 to 24 cm. guns entirely from cast steel. Until now the principal difficulties in this procedure are the dangers arising from shrinkages and the difficulty of pouring long gun barrels of 20 to 30 cm.

In this connection it may be stated that in the United States steel foundries are now successfully pouring gun yokes for 14-in. navy guns. Up to within three years these were made only as forgings. After a severe trial of a number of yokes as steel castings, the navy has now generally adopted steel castings. They are poured as plain carbon steel and as 3 to 3½ per cent. nickel steel and carefully annealed. The castings machine up nearly equal to forgings and are cheaper.

New Induction Motor with Pressed Steel Parts

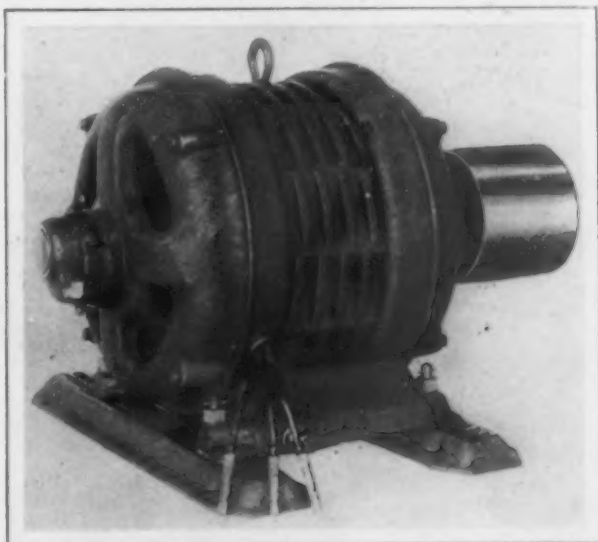
Several noteworthy features are possessed by the new type CS squirrel-cage induction motor which has been recently brought out by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Among these are the extensive employment of pressed steel in their construction, the use of rotors with cast-on short-circuiting rings and moisture and heat resisting insulation, dustproof bearings and a high efficiency of operation.

The first of these features is the marked advance in motor design, it being emphasized that the use of pressed steel imparts great mechanical strength and provides a uniform structure. In this way a motor of a given weight can be made with more active material than a unit of the same capacity with a cast-iron frame. Rolled steel is used for the frames of motors having capacities above 20 hp., the end plates of the smaller sizes and the feet and the slide rails of all sizes. In this way, it is pointed out, great compactness is secured, which is a feature of importance in many applications.

In motors having a capacity of more than 5 hp. the form-wound stator coils are laid in open slots, so that repairs in case of accident can be readily made. In all sizes the rotor bars are insulated with a special cement which resists moisture and will, it is pointed out, withstand a high degree of heat and mechanical stress. The rotor bars in motors larger than 15 hp. are electrically and mechanically connected by casting the short-circuiting rings around their ends, thus giving a construction which is practically indestructible, since there is nothing that can burn out, deteriorate under heat or work loose under vibration.

The bearings are protected from dust by a cap on the front end and by felt washers between metal rings on the pulley end. The motors are being put on the market in all commercial sizes from 1 to 200 hp.

Not only the full load, but also the fractional load



A 10-Hp. Induction Motor of a New Design in Which Pressed Steel is Extensively Used as a Substitute for Cast Iron

efficiency and power factor are high. This last, it is pointed out, is a feature of special importance, as industrial motors generally run at less than full load.

Reports that contemplated improvements by the Taylor-Wharton Iron & Steel Company involved the removal of its High Bridge, N. J., plant are denied. Some rearrangement of its other plants, which include the William Wharton, Jr., Company plants at Philadelphia and Jenkintown, and the Philadelphia Roll & Machine Works at Philadelphia, may be considered, but have not been decided upon.

The McDonald Charcoal Iron Company, which will build a charcoal blast furnace at Ellsinore, Mo., will install mechanical charging equipment of special design for a charcoal furnace. There will be iron pipe stoves for warm-blast practice, the blast being provided by blowing engines of the turbo type.

A New Pickling and Galvanizing Plant

Improvements at the Niles, Ohio, Sheet
Mill of the Brier Hill Steel Company
—The Plunger Type of Pickling Tank

Some important extensions have recently been made to the Thomas Works of the Brier Hill Steel Company at Niles, Ohio, including new galvanizing and pickling departments, in the latter of which a new process of the company is used; also the erection of a new warehouse of steel and brick construction. The original works were built in 1900 by the Niles Iron & Steel Company and contain four hot mills and two cold mills. The entire product of black sheets was sold in the open market. At that time the Niles Iron & Steel Company was composed of J. M. Patterson and W. A. Thomas, the latter now being president of the Brier Hill Steel Company. In 1904 Mr. Patterson retired. In 1905 another hot mill was added and in 1908 seven more hot mills and four more cold mills, so that the present plant consists of 12 hot mills and six cold mills. In 1910 the company became the Thomas Steel Company.

The main building is of steel construction, 60 ft. wide

type and stoker fired, built from designs of the company. Slack is used for fuel. The stokers are motor driven, with all shafting and gearing placed under the floor. After reheating, the sheet bars, following the regular practice, go to the roughing mills for breaking down; then come the passes in the finishing rolls to the number required for the gauge that is being rolled, after which the sheets go to the shears to be sheared and re-squared. Then follow cold rolling and annealing. There are nine double annealing furnaces, each having a capacity for annealing about 40 tons of sheets. After remaining in the annealing furnaces from 24 to 36 hours the sheets are taken to the pickling and galvanizing departments.

New Pickling Department

An addition to the main building, 60 x 400 ft., contains the stock room and new pickling department. In the latter the company has installed six single pickling tanks built



Fig. 1—New Warehouse at Thomas Works of the Brier Hill Steel Company, Niles, Ohio

and 1040 ft. long, and contains the hot and cold mills, annealing furnaces and the pickling department. Power is supplied by two Corliss type engines, through rope drives, each engine driving six hot and three cold mills. One of the engines is 44 x 60 in. and the other 36 x 60 in., built by the Mesta Machine Company, Pittsburgh. The plant has direct switching connections with the Baltimore & Ohio and Pennsylvania Lines West. Most of the sheet bars used come from Youngstown mills and are delivered on track inside the sheet bar building. The bars are picked up by a 10-ton Morgan crane and are stocked in piles. When ready to use they are taken by the same crane to a shear (United Engineering & Foundry Company), which has a capacity for cutting at one time three bars 8 in. in width up to 1½ in. thick. The sheared bars are conveyed by monorail system to the heating furnaces. There are 12 sheet and pair furnaces of the combination

after its own designs. From the black ware room the sheets are conveyed by a crane to a small platform in the pickling department, where they are convenient for the workmen to separate. They are placed on edge in racks or cradles, each of which holds about 4000 lb. The racks are picked up by a crane and after being thoroughly washed are placed in the pickling tanks, the general design of which is shown in Fig. 2. These tanks are of the plunger type, the raising and lowering of the plunger causing the raising and lowering of the fluid. The plunger is operated by a rocker arm driven by a 10-hp. motor, of which four have been installed. The action of the plunger causes a washing action by the agitation of the fluid, which insures a clean sheet, this being very essential in getting the best results in galvanizing. The plungers are motor driven, and all shafting and gearing are placed under the floor. From the pickling tanks the racks are again taken by the

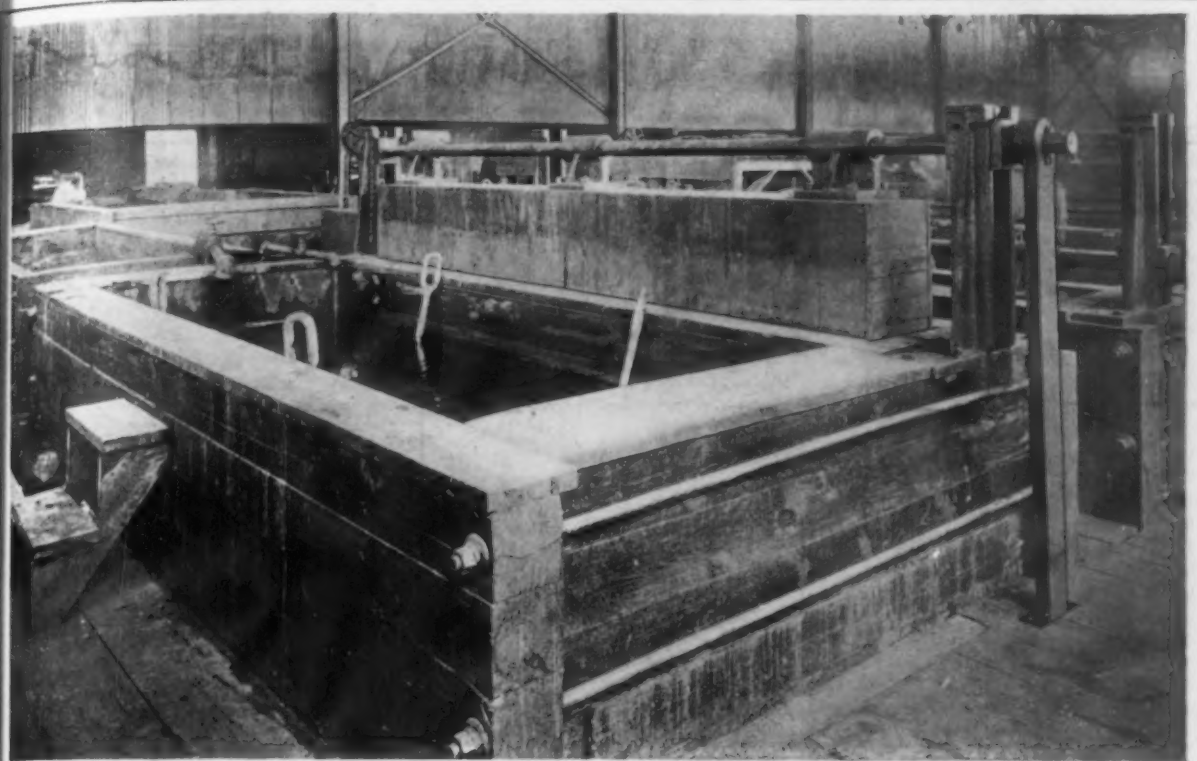


Fig. 2—Special Pickling Equipment at Thomas Works. Plunger in Raised Position. In Vat to the Right Plunger is Lowered

crane and placed in washing tanks, where all of the pickling fluid is removed from the sheet. The racks are now placed in storage tanks, awaiting the coating operation. For that they are taken to the muriatic acid tanks, which represent the final process before galvanizing, and here the sheets are taken from the rack and separated as they are placed in the tanks. There are six double tanks, one for each galvanizing pot, and a 3 per cent. acid solution is used.

The Galvanizing Department

is located between the galvanizing sheet warehouse and the pickling department in a building 20 x 240 ft., which contains six galvanizing pots. It is spanned by a 15-ton Mor-

gan crane. The pots are fired by fuel oil, seven burners being used, two on either side of the pots, two at the back and one in the front. Five of the pots are of the usual size and the sixth is extra large, having a capacity for taking sheets up to 48 in. in width. As the sheets come from the galvanizing bath they are deposited on a continuous chain conveyor which discharges in the galvanizing wareroom. Before they enter this room they pass through a leveling machine, and as the sheets are still hot from the galvanizing bath this last process assures an unusually level product. From the leveling machine the sheets are delivered by a runout table to the cooling wheels, Fig. 3, of which there are six. The galvanizing pots, cooling wheels,

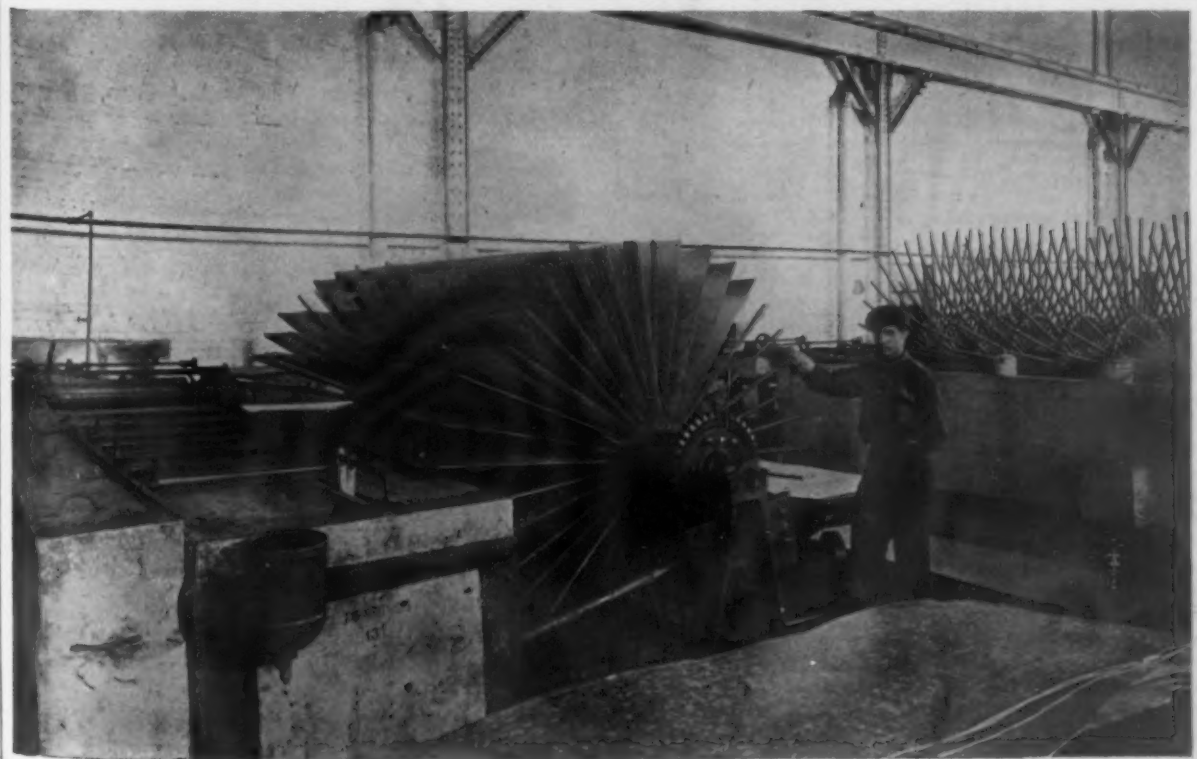


Fig. 3—View of Cooling Wheels in Galvanizing Department, Thomas Works

runout table, etc., are all operated by the same drive. Each cooling wheel holds about 25 sheets at a time, and as one sheet is taken off by the inspector another enters from the bath.

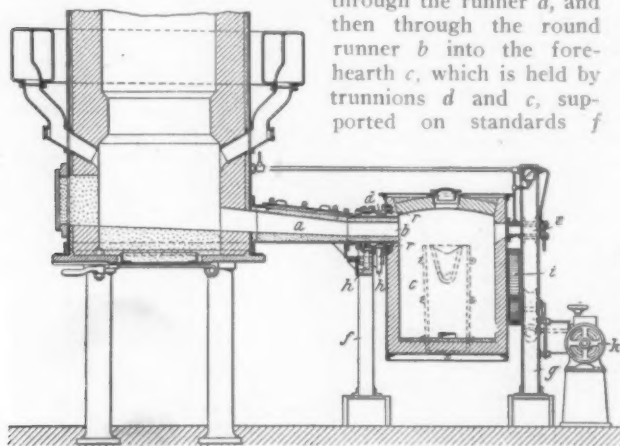
The company operates a roofing department with a capacity of about 80 tons per day of products in all styles of formed roofing. The equipment includes two toggle presses and two roll corrugating machines, one of which, recently installed by the Poorman Company, of New Bremen, Ohio, is of particularly heavy design and will corrugate sheets as heavy as 10 gauge and up to 144 in. in length. The roofing department also contains two power machines for making rolled roofing. The entire plant has a capacity of about 5000 tons of black sheets per month, of 12 to 30 gauge, and of this product about 80 per cent. is galvanized. Early in 1912 the plant at Niles was taken over by the Brier Hill Steel Company, and on the completion of the new open-hearth plant the company is now building at Niles it will supply all the open-hearth bars used.

The company has recently installed a machine for baling scrap, built by Logeman Bros., Milwaukee, Wis. It is operated hydraulically, pressing sheet steel scrap into bundles of convenient size that are handled in charging boxes in the open-hearth department.

A Forehearth for Foundry Cupolas

Advantages from Its Operation at a German Plant—The Mechanism for Tilting

A new tilting forehearth for a foundry cupola is described by the inventor, Edmund Neufang, engineer, in *Stahl und Eisen* of June 26, 1913. The general arrangement and design are shown in the illustration, in which a cross-section of the cupola and the tilting forehearth is given. The iron flows from the cupola uninterruptedly through the runner *a*, and then through the round runner *b* into the forehearth *c*, which is held by trunnions *d* and *e*, supported on standards *f*



Cross Section of Forehearth and Cupola

and *g*. The trunnion *d* rests on two rollers *h*, insuring an easy movement. The lining is the same as in a stationary forehearth. There is an opening in the back of the forehearth and an outlet in the top for the escape of hot gases. The spout is fastened to the iron casing of the hearth. It is removable and is carefully lined with masonry. The front portion of the iron casing of the forehearth has an opening 400 x 700 mm., making it possible to join the brick lining of the spout with that of the hearth, giving a thickness of lining at this point of 250 mm. This is very important, since a firm dividing wall between the forehearth and the spout is necessary. If this were omitted, iron would be forced out by the strength of the blast. But by means of this dividing wall the hearth space is really separated into two containers, and the air pressure in the cupola cannot affect the column of iron which is in the spout. In any case the iron in the spout rises only about 1 to 2 cm. while the blast is acting on the liquid iron. Naturally the spout must be located about 100 mm. lower than the tilting mechanism so that the iron does not flow into the trunnions and render tilting impossible, but rather flows from the spout when full, indicating that it is time to stop off the stream. The depth of iron in the forehearth can

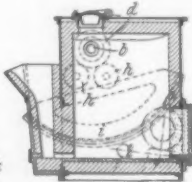
be judged at any time by looking from above into the spout. The trunnion *e* is also hollow and equipped with a glass through which one can inspect the forehearth at any time as well as see into the runner and the interior of the cupola.

The forehearth can be tipped by means of a toothed segment wheel *i* and suitable levers. The manipulation of the hearth is either by hand or, according to a recent improvement, mechanically by an electric motor, shown at *k*. The iron is tapped into small ladles from the tilting hearth.

The most important part of the forehearth is the runner *a*, with its round box *b*. When the third heat was being made in the trials of the new apparatus, the author says, the box melted and allowed the iron to flow on the ground. The lining of the box was inefficient. To overcome this the trunnion *d* was then built like a stuffing box. In it there rests one end of the runner in the form of a strong box of forged iron 20 mm. thick, machined smooth on the outside. Asbestos is put in the stuffing box and rammed in tightly. Inside of the inner part of the forehearth is a second smaller stuffing box. This construction renders it impossible for a flame to penetrate and melt the runner. The stuffing box is regularly repacked every four weeks. One so constructed has lasted now for over a year and a half. Of equal importance is the smearing of the round box *b* through which the iron flows. Fire clay pipes are entirely unfit owing to springing. Kaolin with fire clay and a little graphite is better and excellent.

According to the experience of the inventor, the advantages of the tilting forehearth are: 1. The prevention of serious injuries from burning by molten iron. 2. The pouring off of the smallest residues of iron. 3. The bringing of the slag in the forehearth through the spout. 4. The avoiding of accidents arising from the old method of tapping cupolas.

Mr. Neufang also describes an improvement in his apparatus for reversing the air blast in cupolas. Formerly this was accomplished by means of levers and cogged wheels. The new arrangement consists in manipulating the reversing valves and mechanism by compressed air. A complete description of the details is given in the article.



The Bridgeton Iron Works, Bridgeton, N. J., is distributing an illustration of its building the construction of which started on a bare lot January 6 last and the first heat was run on June 6. The illustration presents a view of an imposing building, constructed of brick, with numerous windows, indicating that the construction operations must have proceeded with unusual celerity.

The New Jersey Engineering & Supply Company, Passaic, N. J., is building a new warehouse, 45 x 100 ft. two stories and basement. It will be for the express purpose of handling Dodge transmission stock, and as soon as completed will be fitted with the proper shelves and racks to accommodate the Standard iron splits, hangers, wood pulleys, etc., which the company carries. As evidence of its aggressiveness, it is now using two automobile trucks and has bought a third one for delivery this month, in addition to which it uses a runabout for the manager and the city salesman.

With sharp European competition, the Nordberg Mfg. Company, Milwaukee, Wis., has been awarded the contract to furnish the Inverness Railway & Coal Company, England, with hoisting apparatus for its mines. It is said that the hoist will be the largest individual piece of its kind in the world. It is 34 x 34 x 72 ft., with 10-ft. drums clutched to the shaft. Each drum has a capacity of 10,000 ft. of 1½-in. rope. The mine is a slope shaft, starting at a 16-deg. grade and going 6000 ft. to a 35-deg. grade. The load on each rope will be 12 cars, each with a capacity of 2200 lb.

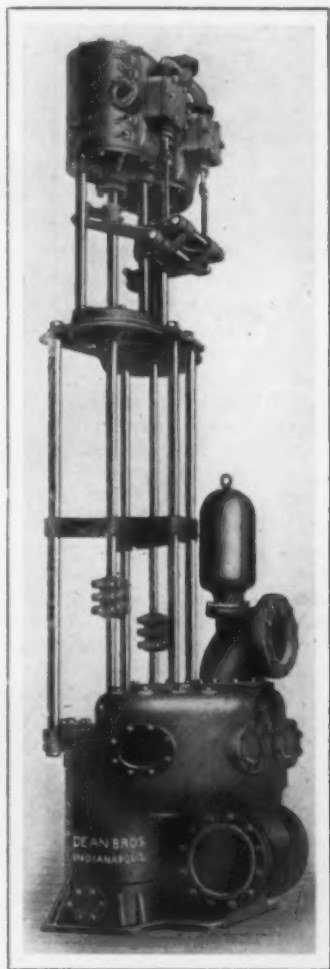
A New Line of Vertical Duplex Pumps

To meet conditions which frequently necessitate the placing of the pump cylinders some distance below the base of the steam cylinders, the Dean Brothers Steam Pump Works, Indianapolis, Ind., has brought out a special design of vertical duplex pumps. The steam cylinders can rest on the floor of the engine room, while the pump cylinders can be located in the basement or a well below, the vertical distance between the cylinders having a maximum of 100 ft. and being varied by changing the length of the extension rods. The advantages claimed for a vertical pump are that it occupies less floor area than the horizontal type and is not subject to as much wear. It is also pointed out that in the horizontal type sediment and grit will deposit on the lower side of the cylinder, thus causing the packings to wear and often cutting the cylinder.

The pump is of the duplex type and has two steam and two water cylinders. The latter are both double-acting and are cast in a single piece. The suction pipe can be brought in from either side, and access to the valves and the pump interior is given by large handholes. The steam end of the pump is of the regular duplex type with adjustable cushioning valves.

The amount of steam required can be regulated by the engineer, and it is pointed out that when the valves have been once set, they do not have to be changed, thus insuring smooth working.

These pumps are made in a number of different sizes, the one illustrated having 16-in. steam cylinders. The pump cylinders are 18 in. in diameter and the stroke is 20 in. The diameter of the suction pipe is 14 in., while that of the discharge pipe is 2 in. less. The weight of the pump is 12,000 lb.



One of a New Line of Vertical Duplex Pumps Designed so that the Pump Cylinders May Be Placed Some Distance Below the Base of the Steam Cylinders

The Sturtevant Company's Canadian Plant

Brief mention was made in last week's issue of *The Iron Age* of the arrangement for a plant in Galt, Ont., by the B. F. Sturtevant Company of Canada, Ltd. The property is such that the manufacturing and assembling of the more important lines as manufactured by the B. F. Sturtevant Company of Boston can be started almost immediately. Arrangements have been made to provide for a growth up to 10 acres of plant, as the establishment of this factory and incorporating in Canada mean a development of the blower business in Canada by the company on the same large scale as has been accomplished in the United States by the B. F. Sturtevant Company of Boston.

The manufacturing, engineering and sales ends will be handled by men trained by the B. F. Sturtevant Company of Boston, and the general policy of that company of manufacturing high grade material for the best class of trade will be carried out. Salesmen are already located to cover Montreal, Toronto and Vancouver sections, and offices will soon be established in each principal city of Canada.

Some of the more important apparatus which will be built are fans and blowers, planing mill exhausters, propeller fans, heating and ventilating apparatus, fuel economizers, mechanical draft, steam turbines, vertical engines, generating sets and stokers. From this plant the company will not only handle all business in Canada but will also export to England, Australia, and other foreign countries.

A New Wood Pulley Company

The Oneida Wood Pulley Company, Oneida, N. Y., has been organized for the purpose of manufacturing wood split pulleys. A large factory building of mill construction will speedily be erected, for which plans and specifications have already been completed. The equipment will be strictly modern, every facility being provided for the economical manufacture of the product, which will be largely marketed in connection with the steel pulleys and shafting appurtenances manufactured by the Oneida Steel Pulley Company of the same city, owning a substantial interest in the new corporation.

Frank W. Farnam, whose knowledge of woodworking and plant management was gained from some 23 years' connection with the Oneida plant of the National Casket Company, will be manager of the new industry. Associated with him will be John Brown, president Madison County Trust & Deposit Company; John Maxwell, president Maxwell Steel Vault Company; Manford J. Dewey, Dewey Piano Company, and E. J. Shepard, general manager Oneida Steel Pulley Company. The new organization expects to be in the market with its pulley about November 1 or very shortly thereafter. It is intended that distribution shall be obtained through leading dealers in the mill supply trade.

A New Tool for Shaping and Planing Machines

The Ready Tool Company, Bridgeport, Conn., has brought out a new type of tool for shaping and planing machines. This tool, which is designated as the style K



The New Red-E Style K Planing and Shaping Machine Tool

tool, it is claimed, will take perfectly smooth and heavy cuts without chatter. It is a single purpose tool, with the old goose-neck principle, where the cutting point is on the line of deflection, and it is pointed out that any springing of the tool takes it away from the work and not into it more deeply.

The tool is made from a chrome nickel steel forging and is held with its cutting edge on a line with the bearing face. A tool steel bearing is provided to take the cutting pressure, and the tool is furnished with high-speed steel cutters made by the Taylor-White process.

American Boiler Manufacturers' Convention

Announcement has been issued by F. B. Slocum, secretary of the Supply Men's Association, Continental Iron Works, West and Calyer streets, Brooklyn, N. Y., that the American Boiler Manufacturers' Association will hold its twenty-fifth annual convention in Cleveland, Ohio, September 1 to 4, inclusive, with headquarters at the Hollenden Hotel. This convention will prove of special interest to boiler and tank manufacturers and steel plate users in consequence of the proposed adoption of the standard and uniform boiler specifications; also from the fact that this convention celebrates the silver anniversary of the association. The local committee has provided an excellent programme of entertainment for the visiting ladies and an excursion on Lake Erie on Wednesday, September 3, for the members and guests. The convention will conclude with a banquet Thursday evening, September 4. All manufacturers and users of steel plate are invited to attend the convention.

An Improved Type of Flow Meter

Interesting Details of a Recently Developed Testing and Commercial Device

To meet the requirements of a strong mechanical meter which can be used not only as a test instrument, but also as a stationary meter for the continuous measurement of either liquids, gases or vapors, the General Electric Company, Schenectady, N. Y., has brought out a new and improved type of flow meter. The body of the meter consists of an iron casting cored out to form one leg of a U-tube, and a reservoir for mercury, the outer leg of the U-tube being formed by a pipe which opens into the reservoir. The pressure on the surface of the mercury varies with the rate of flow of the liquid being measured, and this is the principle upon which the meter operates. Fig. 1 is an exterior view of what is known as the indicating, recording, integrating type, while the internal mechanism of the meter is illustrated in Fig. 2.

A float rests on the surface of the column of mercury in the body of the meter and rises and falls with the corresponding changes in its elevation. The float is geared by a rack and pinion to a horizontal shaft which carries a permanent U-shaped magnet. The poles of this magnet face a copper cap which closes an opening into the meter body. These parts are all shown in Fig. 2. The remaining parts of the meter's mechanism are mounted on the outside of the cap. A shaft, parallel to the one on which the magnet inside the body is mounted, carries a smaller magnet whose poles are opposite the larger ones. This arrangement serves to transmit motion through the cap without piercing it with a shaft, and in this way the difficulty of packing such an entrance to prevent leakage is avoided. As the poles facing one another are of opposite polarity, the magnetic flux binds them together so that a movement of the magnet inside the body involves a corresponding one of the magnet outside, the latter moving an indicating needle and recording pen through the necessary mechanism.

The pressure which moves the column of mercury in the U-tube is obtained either by inserting a modified form of Pitot tube termed a "nozzle plug" directly into the pipe line, where the diameter is greater than 2 in. or by the use of an orifice tube, which is a brass pipe tapered internally from both ends so as to form a restricted opening at the middle of the line for smaller pipe. The nozzle plug can be inserted directly into the pipe line without disturbing the piping except where it is desired to increase the rate of flow at the point of metering, in which case a special pipe reducer is provided. The nozzle plug is a tube with two separate conduits, each having a set of openings on diametrically opposite sides of the tube. Those on the side of the tube facing the flow are called the leading

openings, while those on the opposite side are designated as the trailing ones. The flow against the leading openings sets up a pressure in the leading conduit, which equals the static pressure plus a pressure due to the velocity head, while the flow past the trailing openings causes a suction which lowers the pressure in this conduit. As the two conduits are connected to the U-tube by $\frac{1}{4}$ -in. pipes, the column of mercury is affected by this unbalanced pressure, causing a movement of the float. The orifice tube is incorporated in the pipe line, one leg of the U-tube being connected with the orifice tube near its end and the other to the middle point where the greater velocity at the orifice will give a reduced pressure in the pipe leading to the U-tube.

The chart on which the pen records are made is rotated by clockwork. The recording pen sweeps the chart radially, and the resulting curve shows the rate of flow at any time during the period covered by the chart. The integrating device consists of a stationary flow-rate planimeter driven by the chart paper. The angular position of the planimeter wheel is determined by a cam connected to the shaft of the recording pen and moving with it, the arrangement of the chart and planimeter being illustrated in Fig. 1. The planimeter dials read in arbitrary units which, when multiplied by a constant furnished with the meter, give the flow in the desired unit.

Four different types of meter are made, for recording, for indicating and recording, for recording and integrating and for indicating, recording and integrating, the last being the style illustrated in Fig. 1.

Among the uses to which these meters may be put are to indicate the conditions existing in each unit of a battery of boilers, operating in multiple on the same header. In this way, it is possible to adjust the operation of the units so that each will carry its full share of the load and to ascertain immediately whether the load has increased or the steaming rate of the boilers decreased, in case the steam pressure begins to drop. Other uses of these meters are for the segregation of the cost of steam, water, etc., supplied to each department in a large plant, so that each can have the proper charge made against it, and also in large buildings for determining just what the heating of each office costs, together with the amount of water used.

The Chile Copper Company, the new Guggenheim South American venture, has awarded its \$2,856,000 contract for electrical equipment to Siemens & Schuckert, of Germany, only after the closest competition from American manufacturers. Both the General Electric and Westinghouse companies bid for the business, but the chief factor militating against them, it is stated, was the much higher labor cost in the United States. The order included a coast electrical station, with boilers, machines, transformers and switchboards. Provisionally, four turbine generators of 10,000 kw. each will be installed, while the transmission of electrical energy will be at a tension of 10,000 volts for a distance of 125 miles to a second station. The company will start with seven rotary uniform current converters for a continuous current each of 2500 kw.



Fig. 1—Exterior View of the Indicating, Recording and Integrating Flow Meter

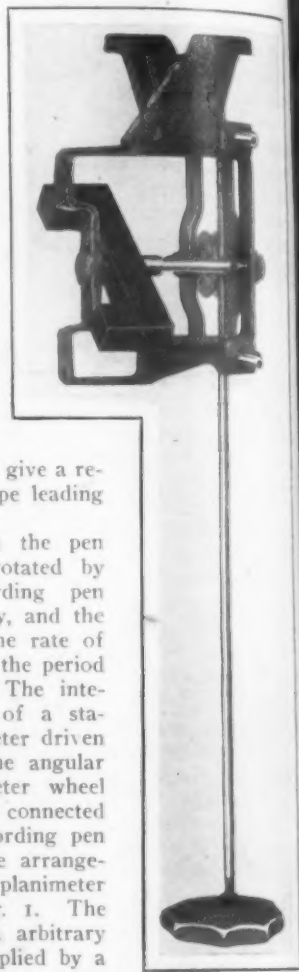


Fig. 2—The Internal Mechanism of the Meter

An Electrically Driven Billet Mill

Tests Showing Efficiency of Motors
in the New Plant at Julienhütte

The results of very detailed tests with the new electrically driven two-high billet mill at the Julienhütte in Upper Silesia, Germany, were recently published in the German journals, from which the following abstract is taken. The rolls measure 114.17 in. from neck to neck and are 41.34 in. diameter. The current necessary for driving is supplied partly by the works gas engine power plant and the remainder from nearby power stations. The two 1000-hp. three-phase a.c. driving motors take current at 83 amperes and 600 volts. On the same shaft with them are two 1450 kw., d.c. generators, furnishing current at 2420 amperes

American Steel Specifications for Foreign Use

Some months ago 20 standard specifications for steel products, as adopted by the American Society for Testing Materials, were brought out in a single volume in English, German, French and Spanish. This action was taken partly in view of the desire of many members of the society to make these specifications known in foreign countries and partly because of the resolution passed at the sixth congress of the International Association for Testing Materials, held in New York in September, 1912, practically recognizing that international specifications for steel products are at present impossible. After the publication of the volume the executive committee of the American Society asked the International Association if it would undertake the distribution of these specifications,

Table 1.—Details of Tests, Each Representing One or Two Complete Heats.

Section of Final bar (Ingot 22.05 in. x 22.05 in.)	Increase in length, times	Time, min.	Number of ingots	Time per ingot, min.	Average initial temperature, °C.	Weight after deducting heat- ing loss, lb.	Current consumption			Remarks
							Total kw.-hr.	Per ton, kw.-hr.	Loss by slip, kw.-hr.	
2.5 sq. in.	79.0	124	13	9.5	1127	112,810	2246	43.9	65.0	Six cold ingots, 1000° to 1090° C.
3.1 sq. in.	18.6	85	17	5.0	1108	146,099	1505	22.7	39.1	
4.7 sq. in.	21.8	45	10	4.5	1102	91,050	911	22.1	28.8	
7.1 sq. in.	9.7	77	20	3.8	1136	181,395	1268	15.4	33.1	Everything very good
3.1 sq. in.	49.0	148	20	7.4	1103	179,940	2945	36.1	113.4	Nine cold ingots 1020° to 1090° C.
2.5 sq. in.	79.0	97	10	9.7	1115	87,963	1833	45.9	60.9	One ingot too cold; back in furnace after three to five passes
3.9 sq. in.	31.4	110	19	5.8	1132	173,127	2320	29.5	86.5	
4.7 sq. in.	21.8	52	10	5.2	1129	92,086	949	22.8	23.9	Two minutes' delay
8.3 sq. in.	7.1	64	20	3.2	1165	186,510	1195	14.1	30.7	
3.1 sq. in.	49.0	77	10	7.7	1135	86,090	1377	35.2	40.0	
4.7 sq. in.	21.8	110	20	5.5	1137	184,172	1895	22.7	45.3	All ingots cold. Much slipping
3.9 sq. in.	31.4	63	10	6.3	1117	89,198	1165	28.8	31.0	
7.1 sq. in.	9.7	48	10	4.8	1107	91,248	873	21.1	The last seven ingots very cold Without the last seven ingots With only one-half of the Ilgner set
7.1 sq. in.	9.7	88	20	4.4	1148	182,695	1403	16.9	....
2.5 sq. in.	79.0	95	10	9.5	1144	83,179	1739	46.1	....
9.8 sq. in.	5.0	41	13	3.5	1155	100,622	609	13.3	The last seven ingots very cold Without the last seven ingots With only one-half of the Ilgner set
9.8 sq. in.	5.0	63	20	3.15	1126	157,827	1124	15.7	....
9.8 sq. in.	5.0	31	12	6.1	1148	79,277	478	13.2	....
4.7 sq. in.	21.8	55	9	2.6	1156	81,041	855	23.2	

and 600 volts, and the Ilgner flywheels. The two rolling-mill motors are each 1000 to 3600 hp., and their speed is 65 to 90 r.p.m.

The tests throughout were carried out to represent normal conditions. One or two complete heats were rolled each time and the total work done carefully measured. The ingots were weighed before charging into the soaking pits and the loss in heating taken as 1¾ per cent., which was the figure actually found in practice. The highest carbon in the steel was 0.135 per cent., and, with the

Table 2.—Average Values for a 24-Hour Test

1 Total a.c. load, including that for exciting dynamo and the fans for roll motors....	1045 kw.
2 Average load for the Ilgner transformer set, including exciting of d.c. generators....	1000 kw.
3 Current delivered to the roll motors....	665 kw.
4 Efficiency of the transformer (item 3 ÷ item 2).....	66.5 per cent.
5 Exciting load for the motors.....	25 kw.
6 Load for the fans.....	20 kw.
7 Load for the motors (items 3, 5 and 6)....	710 kw.
8 Heat losses of the motors.....	46 kw.
9 Other losses.....	18 kw.
10 Output of the motors (item 3 less 8 and 9) = load at the roll coupling.....	601 kw.
11 Efficiency of the roll motors (item 10 ÷ item 7).....	84.6 per cent.
12 Total efficiency of electric drive (item 10 ÷ item 1).....	57.4 per cent.

material worked on, no influence could be observed due to varying composition. The results of the separate tests are brought together in Table 1. The total values for a test of 24 hrs. are given in Table 2, during which time various sized billets were rolled.

G. B. W.

In laying part of a cast-iron water pipe line by the United Fruit Company near Preston, Cuba, through oversight no bends or sleeves were ordered. To avoid the delay occasioned by ordering specials it was decided to try to bend the pipe, as had been done with steel and wrought-iron pipe. A cradle of old rails of the desired curvature was built. About 1 ft. of each end of the pipe was left outside to prevent collapse, and a hardwood fire was built under and around the remainder. Six or eight pipes were bent at a time in from one and a half to two hr., the pipe settling by their own weight into the cradle. The shortest radius used was 50 ft.

with a foreword, to the members of the (international) Railway Congress, which held its last meeting at Berne in 1910. At the Berne meeting the Railway Congress asked the cooperation of the steel manufacturers in the preparation of a report for the next congress, to be held in 1915, on the work of the International Association for Testing Materials in comparing the rail and other steel specifications of the different countries. The executive committee of the American Society offered its 20 steel specifications in four languages as a response to the above action of the Railway Congress.

The matter came up at a meeting of the council of the International Association for Testing Materials held at Amsterdam, March 15, 1913. The minutes of this meeting, which have been distributed in the United States in the past week, have this statement as to the action taken: "After lengthy debate the following decision was passed: The council would be ready to comply with the request of the American executive committee and to distribute the American standard specifications to the members of the Railway Congress (in 1915) to be designated, provided that the other leading iron producing countries decide, on the suggestion emanating from the American Society, to take similar action."

Railroad Business for May.—During May the railroads of the United States received for their services to the public an average of \$8,230,000 a day; it cost to run their trains and for other expenses of operation \$5,920,000 a day; their taxes were \$341,500 a day; their operating income was \$1,972,322 a day for the 220,897 miles of line reporting, or at the rate of \$8.93 for each mile of line for each day. Thus for every six dollars of their earnings which remained available for rentals, interest on bonds, appropriations for betterments, improvements and new construction, and for dividends, the railroads had to pay more than one dollar in taxes. All of these amounts are substantially greater than the similar returns for May, 1912. They are from the summary of the earnings and expenses compiled by the Bureau of Railway Economics from the monthly reports of the steam railroads of the United States to the Interstate Commerce Commission.

The Mechanical Engineers in Germany

A General Review of the Visit of the American Society—Impressions of the German Machine Building Industry

(Staff Correspondence)

LONDON, ENGLAND, July 18, 1913.—The tour of the American Society of Mechanical Engineers through industrial Germany came to a close on July 8 in Munich, and, with the better perspective with which it may now be possible to survey the visit, a few observations may be in order. Prominent in the lasting impression, overshadowing at the first thought all other recollections, is the cordial hospitality shown everywhere. In originality of entertainment, in making every effort to please, in foreplanning for comfort and expedition of the banquets, excursions, plant inspections and other gatherings, the Germans taught a number of lessons which it is safe to say have been learned, and probably well. As already stated in these columns, the visit of the American Society was undertaken under the invitation of the Verein Deutscher Ingenieure, but it is not generally understood how desirous the hosts were to have the visit actually take place nor that there was considerable competition among cities, or rather local branches of the German Society, to be included in the itinerary of the Americans. While the *raison d'être* of the invitation was hinged about a joint meeting of the American and German societies in Leipzig June 23 and 24, the social side and, of course, the commercial side of the proposed visit were more in evidence than the professional possibilities of the joint meeting.

The personal element was easily the conspicuous feature of the gatherings. Advance lists of the personnel of the representatives of the American Society, giving professional and business connections, had been distributed, and once the surface reserve of the German was penetrated he made haste to get acquainted with those he had specially marked on his list. Not so much as might be expected was noted of a commercial purpose or rather possibility in the tour, but occasionally interest was manifested in the trend of the tariff legislation in Washington and in the date when the question would be settled. To repeat, the sojourn in Germany partook distinctly of the nature of a pleasure trip with a sufficient number of plant visitations to help gain an idea of German methods, equipment, product and resourcefulness, thus at the same time accentuating by contrast the entertainment and the educational phases. In many ways the tour also took on an international importance. For example, the society's representatives were entertained by municipalities with banquets in old historic city halls, with the city plate in evidence and with the city wines of rare vintage quite freely offered. Unquestionably interchange of ideas would have gone on apace had there been a common language thoroughly understood by all, but for the considerable transfer of intelligence which did occur the Americans are very heavily indebted to the Germans, so many of whom could converse in English.

Some account has already been given of the Leipzig meeting with the Verein Deutscher Ingenieure in *The Iron Age* of July 10 and July 17, including reference to the first days in Germany spent in Hamburg and to the admirable arrangements for travel, for baggage transportation and for hotel assignments. For general oversight chief credit must be given to Dr. Konrad Matschoss, who gave up all his time to travel with the American Society as the representative of the German Society. It is proper to say at this point that his popularity grew as the trip progressed and it comes to few to witness after so short an acquaintance such a demonstration in his honor as was given to Dr. Matschoss at the closing dinner at Munich and at the special meeting of Americans the next morning. Among others who knew something of the responsibilities of the tour were Calvin W. Rice, secretary of the American Society; Col. E. D. Meier, chairman of the Society's committee on the German visit, and James Hartness, vice-president of the Society, who was obliged

to serve for President Dr. Goss, who, as stated earlier in these columns, could not leave America.

The Factory Visits Viewed Generally

The manufacturing plants visited were many in number and widely varied as regards the character of the industry. Usually a forenoon or an afternoon was given up to simultaneous inspections of a number of plants and the selection was left to the individual as suited his wishes. It is probably safe to say that generally the factories were the best or in some respects models of their class, but the time reserved for the purpose was necessarily limited, and here also much attention was paid to the social side and considerable emphasis was paid to getting over a plant in order to do justice to the luncheon which the manufacturer had provided. Here also was the epicurean in the German conspicuous, and the luncheons were elaborate. The short time at one's disposal, coupled with the numbers which had to be steered through a works, and which made demands on the group guide, detracted from getting the fullest value out of each visit, but general impressions were nevertheless obtained. It must be said that there was no evidence at secretiveness and many valuable suggestions were taken, chiefly in the way of machine details and welfare developments.

The German Machine Building Industry

The machine shops as a rule presented an American atmosphere, partly through the very large percentage of American-made machines in evidence, but the output per machine operated does not apparently average as high as in the United States. The effect of the State liability insurance was noticed in the universal use of machine safeguards, although in no plant visited were the safety measures so complete as in the best American plants. Welfare, so called, is more widely practiced, though in this connection must be remembered the difference in social conditions. Paternalism flourishes as it would not in the United States, but even in Germany it is admitted that the development is still under study and it has in places fostered a spirit of Socialism. It was common to see special accommodation for the education of apprentices, both in shop work and in mental training, this, of course, governed to a greater or less extent by statutes, and in a number of plants so large were the apprentice classes that the apprenticeship problem would seem not to exist.

Finally it may be said that while German shops are close to a plane with American shops and are turning out an exemplary product, there is still much of special work done as distinguished from quantity manufacture in this country or manufacture in identical standardized units. The output per unit wage cost is probably close to that in the United States, but it seemed to be generally believed among the American visitors that by accepting orders surrounded by special conditions unit resultant costs would not be low enough to be of great concern to American machinery manufacturers. It happens, nevertheless, that Germany is watching American tariff matters very closely and once these are settled expects to adjust itself to securing an increased export business. The German manufacturers enjoy the decided advantage that their legislative representatives hold commercial aggrandizement as of supreme importance and everything will be done, even, doubtless, to decided preferential transportation rates, to further business with the foreigner.

It will not be feasible at this writing to mention some of the interesting details noted in the German works, but it is proposed to refer at some length in later issues to various features of some of the German factories.

They were all invariably busy—some of them in making good copies of American machines—under license where patents are still in existence. Their plants are noteworthy for the attention given to external appearance in the matter of the buildings and in the matter of the cleanliness and orderliness everywhere conspicuous in and out of the buildings, not to mention lawns in the midst of buildings, where one in the United States all too often finds little used or obsolete material thrown indiscriminately. It is noteworthy also that the German has put a great deal of dignity into his office or administration building, which in some cases takes on the aspect of a public structure.

A Word on the Festivals

It is to be regretted that space cannot well be given to a detailed account of the remarkable series of receptions and banquets which form so prominent a place in the recollections of the German visit. It is to be regretted that proper mention cannot well be made of the workers in each locality who did so much to make things pleasant. It is a commentary on the originality and resourcefulness of the German host that though there were several affairs each day of the nearly three weeks' official stay in Germany, there were no exact duplications. Most of the Americans were not aware of the German style of conducting a banquet, but they leave the country convinced that interspersing short speeches between courses is not bad and the correspondingly delayed eating is favorable to physical assimilation. Knowing the state dinner procedure, it is not difficult to understand that at least one dinner consumed five hours and more between the voracious and the coffee.

Of these various dinners and luncheons the fortunate American visitors have numerous reminders in the shape of elaborate local programmes, badges, mementos and souvenirs, and they cherish the mental pictures of the gay assemblages of men and women, German and American, busy in conversation or eating choice preparations in old halls of great historic interest festively decorated, sometimes with flags or plate which are rarely taken from their protecting cases, and each occasion gladdened with a form of entertainment different from any other.

W. W. M.

Characteristics of Semi-Steel

In a letter to Engineering, London, John B. Berryman, secretary of the Crane Company, Chicago, says that "semi-steel," or to use his company's trade name, "ferro-steel," designates a very strong cast iron. The term semi-steel is misleading. Many people think that it is partly steel in its nature, and at first thought this view is borne out by the fact that it is usually made in the cupola by charging a good percentage of steel scrap along with pig iron. The truth of the matter is that the properties of the steel scrap are entirely obliterated in the melting and fusion with the pig iron and the cast iron scrap. The resulting product is a cast iron with usually a somewhat lower total carbon content than ordinary cast iron, higher in manganese and purposely lower in silicon, which results in lower graphite and higher combined carbon.

That the addition of steel scrap is not an essential part of the process is indicated by the fact that the Crane Company at times, when economically preferable, makes its ferro-steel by proper proportioning of charges, using pig iron and cast iron scrap and not a pound of steel of any kind. It is the final composition of the alloy and its subsequent treatment which determine its qualities, not what the raw materials were. So ferro-steel (or semi-steel) would be expected to, and does, behave under heat much like cast iron.

The General Electric Company, Schenectady, N. Y., as a result of several years of study in its research laboratory, is about to announce further advances toward higher efficiency of incandescent lamps. Its new lamps contain specially shaped tungsten filaments and are filled with inert gas, such as nitrogen, at a pressure of about an atmosphere. The types which it is expected to develop first are adapted to comparatively high current consumption, 6 amperes and above, and operate at an efficiency of half a watt per candlepower. This is fully twice as high an efficiency as heretofore available.

Use of Coal Tar Oil in the Foundry

Its Rapidly Increasing Employment for Melting Non-Ferrous Metals in Germany

At the spring meeting of the German Foundrymen's Association in Berlin, Chief Engineer R. Hausenfelder, Essen, read a paper on "The Application of Coal Tar Oil in the Foundry." He says that in the last few years coal tar oil has found a generally favorable reception as a source of heat in many different industries in Germany. In the extensive coke plants of the Rhenish-Westphalian coke region nearly two-thirds of the crude tar intended for the production of tar oil, is obtained. The other third comes from the Saar and Upper Silesian regions and from the gas plants. The crude tar, resulting from the dry distillation of the coal, is collected in pits, and then sent for treatment to tar distilling plants. Here it is subjected to further distillation in iron stills and separated into various fractional distillates. The use of coal tar oil for heating purposes has greatly increased lately, ranging from 5000 tons in 1910 to 75,000 tons in 1912. In Diesel motors alone its use has increased from 4000 to 20,000 tons in the same period, with the probability of its aggregating 60,000 tons in 1913.

This coal tar oil, which is used for heating purposes, is obtained from raw naphthalene and anthracene oils. Before these two oils are mixed they are subjected to a cooling process in pans located in an open cooling house swept by the wind. By this means much of the contained naphthalene crystallizes out. The further crystallization that takes place in the containers for the coal tar oil during cold weather is harmless, the separated crystals easily dissolving on heating. Tar oil is a thin liquid and not at all like tar as to toughness. It has a flashing point of about 90 deg. C., and its lowest heat value is 9000 calories. It is technically water-free, and burns completely and free from smoke with a proper mixture of air. It is consumed by bringing it in a finely divided condition into the chamber mixed with air. For metallurgical purposes the atomizing is accomplished by compressed air. The firing of cupolas with tar oil has not been accomplished yet, but open-hearth furnaces, pig-iron mixers, converters and reverberatory furnaces are successfully using it.

Coal tar oil has been especially introduced in Germany in firing crucible and non-crucible furnaces. The author lays stress on its application to the latter as having a great future in the melting of iron, steel and other heavy metals. The oil-fired furnace finds now a wide application in the non-ferrous foundries, aluminum, lead, brass, bronze, copper, zinc, etc., being melted in such furnaces.

In conclusion Mr. Hausenfelder gives some practical examples. For melting iron or steel a furnace of 500 kg capacity is best. To pour 250 to 300 kg of gray iron per hour, an oil consumption of 20 to 25 per cent. is necessary. Steel is poured at 150 kg per hour, with an oil consumption of 40 to 50 per cent.

It should be stated that what is referred to above is not the same by-product now being successfully used by the United States Steel Corporation as a fuel in three of its open-hearth furnaces at Gary, Ind. It is evidently a thin oil, a higher distillate, while what is used here is a tar.

The East River Gas Tunnel

A tunnel under the East River for the conveyance of gas is another important engineering work in the vicinity of New York City which is approaching completion. The rock between the two headings was blasted out July 17. The tunnel, which is heavily lined with concrete, has been bored by the Consolidated Gas Company of New York and connects its great Astoria plant on Long Island with distributing mains in the Bronx and on Manhattan Island. It is nearly a mile long, 21 ft. high, 19 ft. 9 in. wide, and its greatest depth is 246 ft. below the surface of the East River. Two 6-ft. 6-in. mains will run through it at first, to be followed by two others as necessity arises. Large water pipes will also run through it for the company's use, if needed. Work was begun September 12, 1910, and prosecuted under the engineering direction of William H. Bradley, of the Consolidated Gas Company, with Jacobs & Davis, Inc., consulting engineers, and W. C. Morris for the gas company, Vivian Messiter, of Jacobs & Davis, Harold Carpenter and George E. Woods, assistants.

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Hasten the Tariff Revision

Much impatience is manifested in business circles regarding the slow progress being made by Congress in pushing through the revision of the tariff. Even those manufacturers whose business may be adversely affected by drastic cuts in duties on products competitive with theirs are as anxious to have this disturbing question settled as those who have no direct interest in the matter. All feel that the time is now at hand when fall trade may be expected to assume importance, and fear is expressed that it may be seriously checked by uncertainty with regard to tariff duties and as to the effect on prices of merchandise of proposed changes in rates. Every day of useless debate or attention to other subjects in the Senate is severely criticised. What business men most desire now is for the Senate to hasten its work of revising the House bill. If the demand of the country for rapid action be heeded, the tariff bill could be pushed through and gotten out of the way in a couple of weeks. Every day beyond that is valuable time wasted.

The Vogue of Special Steels

At the close of the last century, and indeed in the earliest years of the present century, the quantity of special steels made was almost negligible. There were virtually but two kinds, ordinary soft steel and rail carbon steel. At that time there were buyers, though only a few, who desired steel of special composition and these generally met with cold reception from steel makers when they undertook to make their wants known. Steel makers were just emerging from that fierce struggle for tonnage which made the decade of the nineties memorable, and they regarded all proposed variations or irregularities as a foe to progress.

To this indifference, if not antagonism, to the supposed wants of some buyers there succeeded with striking rapidity an era of competition among steel producers, with the result that in place of turning a deaf ear to the pleas of buyers that modifications in the character of steel would aid them in accomplishing better results, the producer sought out the consumer at the place where he used the steel, and undertook to co-operate in finding means whereby steel could be made more adapted to special requirements. Quickly the producers found that steel could be adapted better to certain uses and that its sale could be pushed in many quarters.

Immense service has been rendered by these investigations. As making two blades of grass grow where only one grew before represents a valuable result, so making one pound of steel perform well a service for which two pounds had formerly been required, and then perhaps with indifferent results, has aided in the development of the industry. It is strongly to be suspected that in the benighted days of a decade or more ago there lurked among some producers an antagonism to such progress, engendered by the fear that thereby the consumption of steel would be reduced.

The suggestion that the development of special steels along the line of making a less weight of steel perform the desired result is not applicable to much of the development that has thus far occurred, but herein we may find the prophecy that development in the future may be still more strongly along that line. Much of the work done in special steel has been along the line rather of increasing the efficiency of the finished product made from the steel, or of prolonging its

life. In the case of the special sheet steels used in the electrical industry, for instance, the result has been to increase the efficiency of the finished apparatus. In the development of special steel for automobile construction the result most important has been to prolong the life of the part. In each of these cases reduction in weight has been an important incident, but not the principal desideratum.

In the production of steel for many forming purposes, again, the object has been chiefly to reduce failures. Taking the run of steel, some steel failed and some did not, and users were not content with a condition in which pieces of steel apparently similar did not all produce prime product. The percentage of failures, even if small, presented an item of loss which deserved study.

To return to the suggestion of reducing the weight of a piece of steel without reducing the service it performs, the fact seems to be that relatively little progress has been made, when compared with the great advance scored in the manufacture of steel sheets to perform certain electrical service, of steel for automobile and other parts to withstand repeated stresses or of steel to undergo difficult forming operations. By far the major portion of steel used in the form of merchant steel bars, of plates and of structural shapes, remains practically simply ordinary soft steel. For this absence of change one specific reason of interest can be vouchsafed, and that is that there are what may be termed structural difficulties in the way of saving material by improving certain physical characteristics—the tensile strength, for instance. Thus a tank, while it must withstand a certain pressure, in which tensile strength simply is involved, must also be of certain stiffness, to prevent collapse through its weight. By increasing tensile strength the pressure could be borne with less thickness of plate, but the stiffness would be reduced. Such a problem must not be regarded as insoluble; the engineer may be able to co-operate with the metallurgist and by modifying the design produce the requisite stiffness when using thinner plates of greater tensile strength. The illustration here used may be crude, but should suggest a principle upon which development may occur.

The constantly increasing size of bridges and buildings is rapidly bringing forward the need for stronger steel, because the weight of the structure as erected is more and more exceeding the load which it is destined to bear. The bridge on a country road, which consists of two beams with planks laid across, will support a load many times its own weight; but when the St. Lawrence River or Hell Gate is to be bridged the chief function of the structure is to support its own weight. The load to be borne is relatively little more than an incident. In a building, there is a theoretical limit of height at which a given steel would crush of its own weight, while in a suspended cable there is a limit of length at which it will part from its own weight.

Since no limit can be found as to the size to which man may wish to push some of his structures, so we are tending to a time when strength in proportion to weight will be the governing element and then in certain cases stronger steel will be neither a convenience nor an economy; it will be a necessity.

Thus while attention may well be directed to the rapidity with which special steels have been developed, bringing on practically a new era in steel manufacture, it becomes obvious that indefinitely greater progress is still to be made.

Larger Steel Freight Cars

A new period in steel freight car construction is being entered upon, with the advent of cars of considerably more than 100,000 pounds capacity. It is significant of the suddenness of the change that practically the first steel cars built were of the 100,000 pounds capacity which is now the vogue, and yet the first all-steel cars appeared more than 15 years ago.

Cars of 140,000 pounds carrying capacity are practically accepted as the new standard for the heavy coal-carrying roads. Many such cars are now being built, and their construction considerably postdates the time at which they were passed upon as desirable, it being necessary to strengthen bridges in order to carry them. One important coal-carrying road has just completed this necessary work and is now building a batch of the cars. Some other roads are still prevented from adopting them because their bridges are not yet all up to the requisite strength; but the indications are plain that within a very few years a great many such cars will be in service.

The steel car has easily "made good." It was but a few years after its advent until the wooden under-frame car passed out of the question. As to the life and repair cost of steel cars, interesting information is furnished in the last report of the Bessemer Railroad, which naturally was the first to adopt them. General Manager Utley says in this report: "Our cost of repairs to steel cars is increasing very rapidly on account of the wholesale renewal of side and floor sheets of our first series of steel cars purchased 15 and 16 years ago." Thus there is no hint of the cars wearing out as a whole. In the past two years the average repair cost of steel cars has been about \$75 per car in service, an amount which cannot be compared with the cost of repairing wooden cars, for with similar service wooden cars would doubtless wear out in less than 15 years.

Box cars with steel superstructure are now being experimented with on a liberal scale, and it is far from improbable that their adoption will be an accepted fact within a few years, thus marking another stage in the use of steel in car construction.

A Welsh Tin Plate Lament

The managing director of the Ebbw Vale Steel, Iron & Coal Company in Wales is quoted as saying that the competition of the "American steel trust" has ruined the tin plate trade of South Wales. The Ebbw Vale manager in so saying is talking at random. In the first place, the Welsh tin plate trade is far from being ruined, and, in the second place, we know of no statistical basis for the statement that the United States Steel Corporation or any other American steel company has been its undoing. There is nothing more familiar in what has been written in recent years concerning British steel trade development than statements as to the enterprise Welsh tin plate makers have shown in building up trade to replace what they lost when the United States established its own tin plate industry. The American tin plate trade has grown by leaps and bounds. So also has the Welsh tin plate trade grown apace.

Going back to the statistics of British iron and steel exports in 1904 we find the statement that in that year the tin plate trade was from every point of view exceptionally prosperous, the exports, which were 359,000 tons, being much larger than those of any pre-

ceding year for a long period. Less than nine years later, or for the first half of the present year, as statistics just printed show, British tin plate exports were 255,000 tons or at the rate of 510,000 tons a year.

As Welsh tin plate is largely exported, these figures give a fair measure of the development of the industry. It is true that in the United States the growth has been much more marked, as indicated by production of 458,000 gross tons of tin plates and terne plates in 1904 and a production of 963,000 gross tons in 1912. But, contrary to what is the case in Great Britain, our tin plate production represents almost entirely home consumption. What the Steel Corporation has done in tin plate exports should not be a matter of serious concern to the Welsh tin plate manufacturers, even though they may particularly lament their loss of business in Canada because of the activity of the leading producer in this country. The total exports of tin plates and terne plates from the United States in 1912 were 81,000 tons. This is not such a percentage of the world's trade in tin plate as to cause alarm in South Wales. What seems to be pressing down the spirit of the manufacturers yonder is the loss of the American market for drawback plates, but that is not such a serious matter measured by tonnage. The present state of funk into which the Welsh manufacturers have fallen should not be permanent. The world's demand for tin plate is growing and they should not be long in developing further outlets as they have been doing for a good many years past.

Some of the factories employing female help in large numbers have adopted the custom of shortening the working time of the women and girls so that they report for work a little later and leave a little earlier than the men and boys. Naturally, this is pleasanter for the great majority of the girls, to whom enforced association with a mass of men, with the chaffing and joking, some of it ill-mannered, is distasteful. The confusion of such a crowd is eliminated. The shop flirtation occurs with much less frequency. When the girls arrive at the factory the men are at work, and by the time the latter leave the girls are on their way homeward. Production loss is slight, as compared with the gain achieved in indirect ways.

A New Cleveland Blast Furnace

Corrigan, McKinney & Co., Cleveland, Ohio, will build a new blast furnace to be operated in connection with their steel plant in that city. Plans for the furnace are now being prepared and contracts will be placed as soon as they are completed. It is the intention to have the stack ready for operation at the time the open-hearth plant and rolling mills are finished. This firm is now operating two merchant blast furnaces in Cleveland. Without an additional one it would require all its pig iron for its steel plant when the latter is completed. The new furnace will be built to supply hot metal for the open-hearth plant. One of the present furnaces will also make basic iron for the steel plant and the other will be run as a merchant furnace. The new stack will be 90 x 22 ft. and will have a daily capacity of about 550 tons. Those now operated produce about 400 tons a day each.

The Hecla Iron & Mining Company, Ironton, Ohio, has been ordered sold by the court, both the mineral and manufacturing property of the company being included in the decree of sale. The receivers are to conduct the sale September 22. The order directs that no bid under \$85,000 be accepted and each bidder will be required to give \$5000 bond. The company is one of the oldest in Ohio and was at one time highly prosperous.

United States Steel Corporation's Earnings

Surplus for the June Quarter \$13,619,365

The statement of the earnings of the United States Steel Corporation and subsidiary companies for the quarter ended June 30, 1913, makes the following showing, as compared with the corresponding quarter of 1912:

	1913	1912
April	\$13,072,710	\$7,509,207
May	14,554,566	8,846,821
June	13,592,537	8,746,237
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants and interest on bonds of the subsidiary companies	\$41,219,813	\$25,102,265
Less charges and allowances for depreciation:		
Sinking funds on bonds of subsidiary companies and depreciation and extraordinary replacement funds.....	7,629,786	5,075,119
Sinking funds on U. S. Steel Corporation bonds:		
Instalments	1,012,500	1,012,500
Interest on bonds in sinking funds...	656,916	585,352
Net income	\$31,920,611	\$18,429,294
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding....	5,642,546	5,714,111
Balance	\$26,278,065	\$12,715,183
Deduct dividends for the quarter on stocks of the United States Steel Corporation:		
Preferred	6,304,919	6,304,919
Common	6,353,781	6,353,781
Surplus for the quarter.....	\$13,619,365	\$56,481

The earnings for the quarter ended March 31, 1913, were \$34,426,801 and the surplus for that quarter was \$7,369,600.

The total earnings for the half year ended June 30, 1913, were \$75,646,614, and the surplus for that period was \$20,988,965, as compared with total earnings of \$42,929,238 and a deficit, after the payment of dividends, of \$6,235,651 for the half year ended June 30, 1912.

Lake Superior Iron & Chemical Company

Announcement is made of details of the plan for reorganizing the Lake Superior Iron & Chemical Company, Detroit, owner of charcoal blast furnaces and of connected plant for the production of charcoal and the by-products of wood distillation. About 70 per cent of outstanding bonds of the company have been deposited with the reorganization committee. The new stock will be \$20,000,000, half 6 per cent. cumulative preferred and half common. Holders of the \$6,485,000 of 6 per cent. first mortgage gold bonds outstanding will receive in exchange an equal amount of preferred stock and a 50 per cent. bonus of common stock. Holders of the \$640,000 of outstanding 6 per cent. gold notes will receive 95 per cent. of the face value of their holdings in preferred stock, without bonus, and the remaining \$407,000 of preferred stock is to be sold for cash.

Owners of preferred stock of the present company will be afforded opportunity to subscribe for an equal amount of the new common stock at \$10 a share and owners of the present common stock may subscribe for the new common stock to an amount equivalent to 25 per cent. of their holdings at \$25 a share. It is calculated that the working out of the plan will give the company \$738,175 in cash available for completion of improvements.

First Cargo of Texas Ore.—At the Santa Fé dock at Port Bolivar, Texas, the steamer Ogechee will take a cargo of Texas ore next week for delivery at the Port Richmond docks, Philadelphia. This is the first shipment by the East Texas Brown Ore Development Company, and the cargo, amounting to about 3500 tons, will be delivered to the Alan Wood Company for its furnaces at Sweedland, Pa. This ore runs about 55 per cent. in metallic iron under 0.10 phosphorus and 6 to 7 per cent. silica.

The Potter Mfg. Company, Geneva, Ohio, elected the following officers at its recent annual meeting: W. A. Potter, president and general manager; John Hasenpflug, vice-president; A. M. Ford, secretary, and A. W. Chamberlain, treasurer. The company has purchased land adjoining its plant and will probably erect some additions, including a tinning plant and warehouse.

Electric Drives for New Bethlehem Mills

In addition to the 35-in. reversing blooming mill and rollers for the new Bethlehem steel plant, the order for which was given some weeks ago to Mackintosh, Hempstead & Co., Pittsburgh, as reported in these columns, the Bethlehem Steel Company has contracted with the Westinghouse Electric & Mfg. Company for the reversing blooming mill drive complete. This includes two main mill motors in series, each designed for 600 volts. d.c. It also includes a motor generator set consisting of one motor, two generators, and a flywheel. The motor is to take current at 6600 volts a.c. coming from the power station, and the two generators are, of course, d.c., also in series of 600 volts each. This set complete is guaranteed to run the 35-in. reversing blooming mill continuously, rolling the maximum tonnage possible of 4 in. x 4 in. and 8 in. x 8 in. It will be guaranteed to reverse in two seconds, and is expected to do better than this. The contract with the Westinghouse company also includes all of the controlling apparatus and switchboard equipment, the whole set being based on the Ilgner system.

The Bethlehem Steel Company has also contracted with the General Electric Company for twelve motors, driving the following mills: 22-in. merchant mill, 16-in. roughing, 12-in. finishing, 12-in. roughing, 8-in. finishing, and 10-in. merchant mills; 21-in. puddle mill; 12-in. merchant mill; 16-in. roughing; 12-in. finishing, 12-in. roughing, and 9-in. finishing crucible mills. These motors range from 350 to 1800 hp, some of them being direct connected to the mills, and in several cases connected through a train of gears, due to the slow speed of the mills. The motors are designed for 6600 volts a.c., and are all used on three-high mills. Separate motors were purchased for the roughing and finishing mills in every case, so that no belt or rope drive will be required. The motor equipment includes automatic controllers, necessary switchboard, etc. The power for all of the motors is to be furnished from the company's central gas engine power house, three additional gas engines for which are being built in the Bethlehem shops from the company's own designs.

Mining Engineers' Iron and Steel Meeting

The Iron and Steel Committee of the American Institute of Mining Engineers announces the following papers for the meeting of the Institute to be held in New York on October 16 and 17:

- H. M. Howe, Equilibrium Temperature for Ae_3 in Carbon Steel.
- H. M. Howe, The Divorcing of the Eutectoid in Meteorites.
- H. M. Howe and A. G. Levy, Determination of the Position of Ae_3 in Carbon-Iron Alloys.
- G. K. Burgess, J. J. Crowe, and H. S. Rawdon, Thermal and Microscopical Examination of Professor Howe's Standard Commercial Steels.
- H. M. Howe, Discussion of the Existing Data as to the Position of Ae_3 .
- I. H. Hall, Shock Tests of Cast Steel.
- H. F. Miller, Jr., New Design of Regenerators for Open-Hearth Furnaces.
- E. Stutz, The Scoria Process for the Manufacture of Fine-Ore Briquettes.
- I. H. Hall, The Life of Crucible Steel Furnaces.
- Felix A. Vogel, Briquetting.
- J. E. Johnson, Jr., The Influence on Quality of Cast Iron Exerted by Oxygen, Nitrogen, and Some Other Elements.
- R. K. Abbott, Influence of Alloying Elements in Carburization of Steel.
- J. V. Emmons, Some Phases of the Practical Treatment of Tool Steel.
- Use and Advantage of Briquettes in Blast Furnace Practice.
- William A. Forbes, Blast Furnace Gas Cleaning.
- G. H. Clevenger and B. Ray, Influence of Copper upon the Physical Properties of Steel.
- W. R. Shimer, Over-Oxidation of Steel.
- G. L. Norris, The Resistance of Steels to Wear in Relation to their Hardness and Tensile Properties.

In addition there are prospects of about ten other papers. A. A. Stevenson, H. D. Hibbard, J. E. Johnson, Jr., E. Gybbon Spilsbury and H. M. Boylston have been appointed to take charge of the programme and entertainment at the October meeting. A. A. Stevenson has been named as an additional vice-chairman of the committee and is acting chairman in the absence abroad of Prof. Albert Sauveur.

The German production of pig iron increased from 2,000,000 tons, or 49 kg. per inhabitant, in 1872, to 17,500,000 tons, or 262 kg. per inhabitant (over five fold), in 1912. In the same period the consumption per person grew from 60 to 183 kg.

The Iron Ore Resources of Brazil

Large Deposits in Minas Geraes Running High in Iron—Cost at Atlantic Ports

The annual report of George Chalmers, general superintendent of the St. John del Rey Gold Mining Company of Brazil to his company, referred to editorially in the Iron and Coal Trades Review, London, contains interesting information concerning the iron ore resources of that country. Besides its gold mining operations the company referred to has been buying iron ore properties since 1903 until now it owns over 90,000 acres of deposits of intrinsic value. Referring to the iron ores of the Minas Geraes district, Mr. Chalmers says that in one direction for 23 miles one can travel almost entirely on canga or crust, rubble ore or outcrops of iron. In another direction something like 16½ miles can be covered over the same wealth of iron. In numerous places, beginning with those close to the mine, there are extensive areas of canga or crust, 1,000,000 to 1,500,000 sq. yd. in area with masses of solid hematite in places. Some years ago a little exploration was done on these crusts to ascertain the thickness, tons, etc., and this went to show that it averaged about 60 per cent. iron and was rather high in phosphorus, while the hard hematite went from 60 to 67 per cent. and was low in phosphorus. In November, 1911, sanction was obtained to begin exploration of the ore bodies beneath the crust. What has been done in the past year shows that the lodes beneath the crust are in some cases not only infinitely more valuable than the crust and rubble ores referred to, being of much higher iron content and very low in phosphorus, but as regards tonnage, great as the former may be, there is practically no comparison.

In one deposit alone in which Mr. Chalmers originally estimated the crust, or surface ore in sight, as under 30 million tons, showing an average content of 60 per cent., he now confidently estimates that from the crust down to the portion explored by tunnels, there is at least 160 million tons. Of the continuance of the lode to a great depth there is little doubt, but even from the lowest point at which it could be explored by tunnels in the side of the mountains to where it would be possible to extend the railroad, ore would be laid open that would more than treble that amount. Cross-cuts that have been put into the lode measure in all 1589 ft., and the average assay derived from some 570 samples taken at equal distances throughout that length gives 67.3 per cent. iron and 0.053 per cent. phosphorus. Another feature of the ore will commend it to the mining engineer, namely, that the tunnels have been driven rapidly with only light blasting; at the same time no timbering has been necessary, with the exception of points where lines of yellow ochre have been passed through. From this it will be gathered that the ore can be economically stoped, while at the same time it is not too friable for transport.

The above refers to only one deposit, while the total deposits of iron ore of the state of Minas Geraes extend over a wide area. Mr. Chalmers says that the quality is so good and the amounts so great that extensive expenditures are justified for railroads to export the ore. Present railroad facilities are entirely inadequate unless double-tracked.

It is estimated by William Jones, another engineer, that this ore can be laid down at North American or British ports at 23s. 6d. per ton. Mining cost is put at 2s., land freight at 9s. and sea freight at 12s. 6d. per ton. It is also his opinion that these ores will be cheaper for delivery in the near future at North American ports than Cuban ores, apart from any advantage due to the purity of the ores from Brazil. Mr. Chalmers considers that the actual amounts of high-grade ore will prove to be much larger than even present estimates.

Announcement made at Birmingham, Ala., of improvements that will be made by the Tennessee Coal, Iron & Railroad Company refers to a \$9000 school house and 100 dwellings at the Edgewater coal mining camp, outlays of \$15,000 for domestic water supply at Ishkooda and of \$20,000 for sanitation at Muscoda. Fossil, Ishkooda and Patten mines, addition of electric pumping equipment at Pratt No. 1 division, and the opening of No. 9 slope at Blocton mines, at a cost of \$26,000.

The Iron and Metal Markets

Firmer Prices for Pig Iron

A Steel Company Buys 75,000 Tons

Steel Corporation Earnings an Encouraging Factor—Conservative Buying by Implement Makers

The Steel Corporation's statement showing \$41,200,000 net earnings in the quarter ending with June—an amount only exceeded in one other second quarter, that of 1907, and in but three quarters in the corporation's history—is more impressive than the actual market facts of the week. Such a showing from a period so recent and the knowledge that current operations are yielding profits fully as good are favorably interpreted, even though new buying of finished steel is less than half current shipments.

The increase of \$6,800,000 upon the Steel Corporation's earnings for the first quarter was due in part to the earnings of its Minnesota roads from ore carried in May and June for outside interests and to the excellent cement business, which naturally figures small in winter months. There was also the increase due to the higher average prices on material shipped in the last quarter; then, too, the floods of the first quarter cut off nearly \$1,000,000.

Pig iron has given more proof of a turn than in any week of the long succession of declines and repeated announcements of the bottom. Quite significant is the buying of about 75,000 tons of Bessemer and basic iron by a Youngstown steel company at \$15.50 at furnace for the former and \$14.25 for the latter. Deliveries are in August, September and October. Other sales of steel-making iron are under negotiation, but furnaces are asking something more than the above prices. Cincinnati reports a 10,000-ton sale of basic to a Central Western steel works.

Producers of foundry pig iron in various districts have plucked up courage to mark up their prices 25 to 50 cents. In the Chicago district it is doubtful if much business could now be put through below a 50-cent advance upon the low prices of two weeks ago. At Buffalo, also, after very considerable sales with little publicity, asking prices are to-day nearly 50 cents above the lowest. Not much Southern iron is now to be had at \$10.50 Birmingham. At Pittsburgh a large buyer has taken on 5000 tons of Northern foundry iron at close to \$13.75 Valley furnace.

The pig-iron situation seems to have reached the familiar second stage of a buying movement produced by prices that leave out profit. Some sellers, having a good backlog, decide not to add to it except at an advance.

This firmer attitude is helped by the July reduction in production of merchant iron. Furnace stocks accumulated in May and June; in the Chicago district shipments were held up and furnace piles ran up rapidly. A feature of the late movement were the concessions made where the buyer would take the iron at once.

It is noteworthy that a number of heavy melters of iron have thus far held aloof and that in the sales sheets large lots are the exceptions. Much foundry iron must yet be bought for the second half if the present melt is kept up.

Some further agricultural bar contracts are reported, but the largest interest has not yet closed. The implement makers have bought carefully, in spite of the history of the revision of such contracts when the market has declined. Canadian buying of implements

is considerably less than last year, though crop prospects are all they were a year ago. The limitations on credit are a factor there, as well as on this side.

With a few exceptions, as in tin plates and some gauges of sheets, buyers now find that 30-day deliveries can be had on steel products. Under such conditions heavy contract buying will not soon be resumed.

A large producer has met the 2.25c. price on No. 28 sheets which has been had from several mills. No other formal announcement of a reduction has been made, apart from lower store prices on sheets in the Chicago district. In the wire trade there has been no formal withdrawal of prices that for some time have stood as the level from which to figure reductions of \$2 a ton. In bolts and nuts irregularities have caused more comment.

Noteworthy transactions in the heavier steel products are lacking. The wrought pipe trade maintains its exceptional position. A Youngstown mill has taken 180 miles of 12-in. pipe for a gas line from the Inez, Ky., field to Louisville.

Structural orders this week have been chiefly of smaller caliber, but there have been a good many of them. For the sister ship to the Pennsylvania the Government will open bids August 5 at Brooklyn for 10,000 tons of plates, 2500 tons of bars and angles and 750 tons of beams and channels.

An Eastern cast-iron pipe maker has sold 10,000 tons for the extension to the New York high-pressure fire prevention service.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	July 30,	July 23,	June 25,	July 31,
	1913.	1913.	1913.	1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	\$15.50	\$15.50	\$16.00	\$15.75
Foundry No. 2, Valley furnace	13.75	13.75	14.00	13.50
Foundry No. 2, S'th'n, Cin'ti...	13.75	13.75	13.75	14.75
Foundry No. 2, Birmingham, Ala.	10.50	10.50	10.50	11.50
Foundry No. 2, furnace, Chicago*	14.75	14.75	15.00	15.00
Basic, delivered, eastern Pa....	15.00	15.00	15.50	15.75
Basic, Valley furnace.....	14.25	14.35	14.50	13.50
Bessemer, Pittsburgh.....	16.40	16.65	16.90	15.40
Malleable Bessemer, Chicago*..	14.75	14.75	15.00	14.50
Gray forge, Pittsburgh.....	14.40	14.40	14.65	14.15
Lake Superior charcoal, Chicago	15.25	15.75	16.25	16.25
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh...	27.00	26.50	26.50	21.50
Open hearth billets, Pittsburgh..	27.00	26.50	26.50	22.00
Open hearth sheet bars.....	27.50	27.50	27.00	22.50
Forging billets, Pittsburgh.....	34.00	34.00	34.00	28.00
Open hearth billets, Philadelphia	28.00	28.00	28.00	24.40
Wire rods, Pittsburgh.....	28.00	28.00	29.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	14.00	14.00	14.00	16.00
Iron rails, Philadelphia.....	17.50	17.50	17.50	16.50
Carwheels, Chicago.....	12.75	12.75	13.50	13.50
Carwheels, Philadelphia.....	12.00	12.00	13.00	14.00
Heavy steel scrap, Pittsburgh..	12.25	12.25	12.50	13.25
Heavy steel scrap, Chicago....	10.50	10.50	10.50	11.50
Heavy steel scrap, Philadelphia.	11.25	11.25	11.50	13.50
Finished Iron and Steel,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.42½	1.42½	1.47½	1.32½
Iron bars, Pittsburgh.....	1.65	1.65	1.65	1.35
Iron bars, Chicago.....	1.50	1.50	1.50	1.40
Steel bars, Pittsburgh.....	1.40	1.40	1.40	1.25
Steel bars, New York.....	1.56	1.56	1.56	1.41
Tank plates, Pittsburgh.....	1.45	1.45	1.45	1.30
Tank plates, New York.....	1.61	1.61	1.61	1.46
Beams, Pittsburgh.....	1.45	1.45	1.45	1.30
Beams, New York.....	1.61	1.61	1.61	1.46
Angles, Pittsburgh.....	1.45	1.45	1.45	1.30
Angles, New York.....	1.61	1.61	1.61	1.46
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.25
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.30
Steel hoops, Pittsburgh.....	1.60	1.60	1.60	1.40
Sheets, Nails and Wire,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	2.00
Wire nails, Pittsburgh.....	1.70	1.70	1.80	1.65
Cut nails, f.o.b. Eastern mills..	1.75	1.75	1.80	1.70
Cut nails, Pittsburgh.....	1.65	1.65	1.70	1.55
Fence wire, ann'l'd. 0 to 9, Pgh.	1.55	1.55	1.60	1.45
Barb wire, galvanized, Pittsburgh	2.20	2.20	2.20	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,	July 30, 1913.		July 23, 1913.		June 25, 1913.		July 31, 1912.	
	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.
Per Net Ton at Oven:	\$2.50	\$2.50	\$2.50	\$2.10	\$2.25	\$2.25		
Burnt coke, prompt shipment	2.50	2.50	2.25	2.25				
Burnt coke, future delivery..	2.75	2.75	2.75	2.40				
Foundry coke, prompt shipment	3.00	3.00	3.00	2.50				
Foundry coke, future delivery..								

Metals.	Per Pound to Large Buyers:	Cents.			
		1913.	1912.	1913.	1912.
Lake copper, New York.....		15.25	14.50	15.00	17.70
Electrolytic copper, New York		15.00	14.37½	14.50	17.60
Spelter, St. Louis		5.45	5.25	4.95	7.10
Spelter, New York		5.60	5.40	5.10	7.25
Lead, St. Louis.....		4.35	4.22½	4.22½	4.57½
Lead, New York.....		4.50	4.35	4.35	4.70
Zinc, New York.....		40.25	42.00	44.10	45.50
Antimony, Hallett, New York.		7.75	7.75	8.15	8.00
Tin plate, 100 lb. box, Pittsburgh		\$3.60	\$3.60	\$3.60	\$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb. New York, 10c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 24c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 10 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.50c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 2.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel .....	.30
Marine steel .....	.40
Locomotive firebox steel .....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and tees, 3 in. and over, 1.45c. to 1.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in. ....	.10
H-beams over 18 in. ....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail) .....	.05
Angles, channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees .....	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, \$28 to \$28.50. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.50 to \$1.60; galvanized, \$1.90 to \$2. Galvanized barb wire, to jobbers, \$2.10 to \$2.20; painted, \$1.70 to \$1.80. Wire nails, to jobbers, \$1.70 to \$1.80.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.							
Nos.	0 to 9	10	11	12 & 12½	13	14	15
Annealed	\$1.70	\$1.75	\$1.80	\$1.85	\$1.95	\$2.05	\$2.15
Galvanized	2.15	2.15	2.20	2.25	2.35	2.45	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from May 27, 1913, and iron pipe (full weight), from June 2, 1913:

Steel.			Iron.		
Inches.	Black.	Galv.	Inches.	Black.	Galv.
¾, ¾ and ¾.....	72	51½	¾ and ¾	66	47
¾	76	65½	¾	65	46
¾ to 3	79	70½	¾ to 2½	69	56
			¾ to 2½	72	61
Lap Weld.					
2	76	67½	1½	56	45
2½ to 6.....	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.					
1 to 3, butt.....	77	68½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	70	59
2½ to 4, lap.....	76	67½	1½, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap.....	68	59

Butt Weld, extra strong, plain ends.					
¾, ¾ and ¾.....	67	56½	¾	63	52
¾	72	65½	¾	67	60
¾ to 1½.....	76	69½	¾ to 1½	71	62
2 to 3	77	70½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.					
2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.					
¾	62	55½	¾	57	49
¾ to 1½	65	58½	¾ to 1½	60	52
2 to 2½	67	60½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.					
2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		Standard Charcoal Iron.	
1½ and 2 in.....	60	1½ in.....	44
2½ in.	57	1½ and 2 in.....	48
2½ and 2¾ in.....	63	2½ in.	44
3 and 3½ in.....	67	2½ to 2¾ in.....	53
3½ to 4½ in.....	69	3 and 3½ in.....	55
5 and 6 in.....	63	3½ to 4½ in.....	58
7 to 13 in.....	60	Economy special grades bring higher prices.	

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2½ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.		Cents per lb.
Nos. 3 to 8		1.70
Nos. 9 to 10		1.75
Nos. 11 and 12		1.80
Nos. 13 and 14		1.85
Nos. 15 and 16		1.95

Box Annealed Sheets, Cold Rolled.		
Nos. 10 and 11.....		1.90 to 2.00
No. 12		1.90 to 2.00
Nos. 13 and 14		1.95 to 2.05
Nos. 15 and 16		2.00 to 2.10
Nos. 17 to 21		2.05 to 2.15
Nos. 22 and 24		2.10 to 2.20
Nos. 25 and 26		2.15 to 2.25
No. 27		2.20 to 2.30
No. 28		2.25 to 2.35
No. 29		2.30 to 2.40
No. 30		2.40 to 2.50

Galvanized Sheets of Black Sheet Gauge.		
Nos. 10 and 11		2.30 to 2.40
No. 12		2.40 to 2.50
Nos. 13 and 14		2.40 to 2.50
Nos. 15 and 16		2.55 to 2.65
Nos. 17 to 21		2.70 to 2.80
Nos. 22 and 24		2.85 to 2.95
Nos. 25 and 26		3.00 to 3.10
No. 27		3.15 to 3.25
No. 28		3.30 to 3.40
No. 29		3.45 to 3.55
No. 30		3.60 to 3.70

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Pittsburgh

PITTSBURGH, PA., July 30, 1913.

The better feeling recently noted has developed into more than sentiment, nearly all the leading steel companies stating that actual new orders booked in the past week have been somewhat heavier than in any one week for some time. For months consumers have been buying little or no material, and stocks all over the country have been greatly reduced. As yet there has been no disposition shown by consumers to anticipate, but they are coming in the market oftener and some are buying more freely. The coke makers are still firmly holding furnace coke at \$2.50 per net ton at oven. There is a good deal more inquiry for pig iron, but prices have settled to a lower basis. Whether bottom has been reached is a question, but it is certain that merchant furnaces that buy their ore and coke cannot sell pig iron at current prices and make a fair profit. The demand for plates, shapes, lap-weld pipe and several other lines is fairly heavy, but sheets, tin plate and wire goods continue quiet. The leading mills have a good deal of work ahead that will carry them over the next two or three months, but some of the smaller ones are taking new business on the promise of practically prompt delivery, particularly in plates and sheets. There is confidence that early September will bring a healthy buying movement, though likely to be confined to early needs. There is less incentive for consumers to contract ahead than at any time this year.

Pig Iron.—Inquiry is more active, and consumers are beginning to believe that prices are close to bottom. The Westinghouse Air Brake Company has closed for about 5000 tons of foundry iron for delivery over the remainder of the year on the basis of close to \$13.75, Valley, for No. 2. Negotiations involve considerable tonnage in both Bessemer and basic and there is also an inquiry out from a local consumer for upward of 4000 tons of forge iron for delivery over the remainder of the year. Merchant furnaces are complaining about the high prices charged for coke and reports are current that several stacks may go out in the near future, but these are not verified. Prices on Bessemer and basic are lower. We quote: Bessemer iron, \$15.50 to \$15.75; basic, \$14.25 to \$14.35; malleable Bessemer, \$13.75 to \$14; No. 2 foundry, \$13.75 to \$13.85; gray forge \$13.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh or Cleveland district being 90c. a ton.

Later, by Telegraph.—The Youngstown Sheet & Tube Company has purchased practically all the Bessemer and basic pig iron it could get in the Mahoning Valley for August, September and October delivery. It tried to have deliveries extended over the remainder of the year, but the furnaces would not sell at present prices for delivery beyond October. The total quantity taken is probably 75,000 tons, and prices were on the basis of about \$14.25 at maker's furnace for the basic and \$15.50 for the Bessemer, or \$14.40, delivered at East Youngstown, for the basic and \$15.65 for the Bessemer. The company is of the opinion that bottom has been reached in prices of Bessemer and basic pig iron and therefore made these purchases. The opinion is strong among other consumers that prices have probably touched bottom and more iron is being bought than for some months. A local interest has closed for about 5000 tons of forge iron for remainder of the year delivery at about \$13.35 to \$13.40, Valley furnace, and the American Steel Foundries has bought 1500 tons of basic for its Sharon works at about \$14.25, Valley furnace. Several other large deals in both Bessemer and basic are under way and will likely be closed before the week is over.

Billets and Sheet Bars.—There is more new inquiry out for billets and sheet bars than for some time. The National Tube Company has bought 6000 to 7000 tons of open-hearth billets from an Eastern mill. This company has bought in the open market this year close to 100,000 tons of steel, the business having been divided between local and Eastern mills. Consumers are specifying freely against contracts, and shipments by the mills are heavy. We quote Bessemer and open-hearth billets for prompt delivery and also for shipment over remainder of the year at \$27, and Bessemer and open-hearth sheet bars for the same delivery at \$27.50, maker's mill, Pittsburgh or Youngstown. The smaller steel mills that occasionally come in the market shade these prices about 50c. a ton. We quote forging billets at \$34 and axle billets at \$29, maker's mill.

Ferroalloys.—The official price of \$58.50, Baltimore, for 80 per cent. ferromanganese does not seem attractive to consumers, and no large lots have been closed

since this price was put in effect. Carloads for prompt delivery are still being sold at \$58 or less, Baltimore. We quote 80 per cent. ferromanganese at \$58 to \$58.50, Baltimore, the freight rate for delivery in the Pittsburgh district being \$2.16 per ton. We note sales of several carloads of 50 per cent. ferrosilicon at the full price of \$75, delivered in the Pittsburgh district. We quote 80 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons or 600 tons, \$74; over 600 tons, \$73, Pittsburgh.

Wire Rods.—A local interest reports sales of several small lots of Bessemer and open-hearth rods at \$28.50 to \$29. The new demand is quiet, and specifications against contracts are only fair. We quote Bessemer, open hearth and chain rods at \$28 to \$28.50, Pittsburgh.

Muck Bar.—Three local concerns have signed the Sons of Vulcan puddling scale, and the expected shortage in supply of muck bar will probably not develop. There is a fair amount of new inquiry, and we quote best grades of muck bar at \$31 to \$31.50, Pittsburgh.

Skelp.—The local skelp mills are busy, and in some cases are considerably behind in deliveries. The pipe mills are running to full capacity and the consumption of skelp at present is probably heavier than ever before in the history of the pipe trade. We quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.70c. to 1.75c.; sheared iron skelp, 1.75c. to 1.80c., all delivered to buyers' mills in the Pittsburgh district.

Steel Rails.—New inquiry for both standard sections and light rails is more active, the Carnegie Steel Company reporting new orders entered last week for a heavier tonnage than in any one week for some months. It has enough actual orders on its books to run the Edgar Thomson rail mills to full capacity for the next two or three months. Last week it received new orders and specifications for over 4000 tons of light rails. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—It is understood that the Newport News Shipbuilding & Dry Dock Company has taken two boats for the Mallory Line, and the plates and shapes, about 6000 to 8000 tons, will go to the Cambria Steel Company. Bids have been asked by the Government on a sister battleship of the Pennsylvania to be built at the Brooklyn Navy Yard, taking 13,000 to 14,000 tons of plates and shapes, including the protective deck plates. It is understood that a gas holder for Montreal, Canada, taking about 2500 tons, has been placed with Bartlett, Hayward & Co., the material to be furnished by the Carnegie Steel Company. The leading plate mills are pretty well filled for the next two or three months, but some of the smaller ones are now in shape to take orders for delivery in two or three weeks, on which they are quoting 1.45c. at mill. We quote 1/4-in. and heavier plates for delivery in two to three weeks at 1.45c. to 1.50c., while for forward delivery 1.45c. at mill is being firmly held.

Structural Material.—New inquiry is active, but actual work placed in the past week was light. The American Bridge Company has taken about 3000 tons for a new bridge for the Baltimore & Ohio Railroad at Glenwood, Pa., and the McClintic-Marshall Construction Company has taken about 1500 tons additional work for export. As yet the contract for 1000 tons for new buildings for the Pennsylvania Rubber Company, Jeanette, Pa., has not been closed. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. Small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Iron and Steel Bars.—There has been a good deal of activity in the steel bar market the past week, a number of the larger implement makers that have been waiting in the hope of getting lower prices having finally decided to come in and buy. Three of the leading consumers of this class closed their season contracts last week and negotiations are on with two more. Part of this tonnage came to Pittsburgh, but most of it went to the Chicago district. Nearly all the implement makers are now under cover, and in some cases contracts run up to July 1 of next year. It is stated that 1.40c. was minimum on all these contracts, which carry the provision, however, that if a decline in prices occurs the consumers who have contracts will get the benefit of it. The steel bar mills now have a very large amount of business on their books for delivery up to July 1 of next year, and specifications are coming in at a fairly satisfactory rate. The new demand for iron bars is only fair, and several of the

makers may soon be short of work. Three local concerns have signed the Sons of Vulcan scale. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.65c. to 1.70c. for delivery in six to eight weeks. The mills continue to charge \$1 extra per ton for twisting 3/4-in. and larger steel bars and \$2 extra for 1/2 to 5/8 in.

Sheets.—A leading sheet mill states that it has reduced its base price on No. 28 Bessemer or open-hearth black sheets box annealed, one pass through cold rolls, to 2.25c. but is still maintaining 2.35c. base for automobile and metal furniture stock, which has to be of special drawing quality. There is a reported better feeling in the sheet trade, and the opinion is that some jobbers and large consumers may hold off placing orders too long, and may not be able to get the deliveries wanted later. The supply of steel seems to be ample to meet the demand, and there is practically no delay in operations on this account. The leading interest has not officially changed its prices on sheets, which are 2.35c. for No. 28 black and 3.50c. for No. 28 galvanized, but at the same time is taking care of its customers. Reports are still current of galvanized sheets being offered on the basis of 3.25c. for No. 28 galvanized, but if this is being done it is only in isolated cases. We quote No. 10 blue annealed sheets at 1.75c.; No. 28 Bessemer black sheets, 2.25c. to 2.35c.; No. 28 galvanized at 3.30c. to 3.40c., and Nos. 28 tin mill black plate 2.25c. to 2.30c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts are showing a slight improvement. Leading makers say they are pretty well fixed with specifications for the next three or four months, and, with the practical assurance of a heavy fruit crop, specifications are expected to be active for the remainder of the year. New business is confined entirely to carload and smaller lots, nearly all consumers being covered by contracts. We quote 100-lb. cokes nominally at \$3.60, and 100-lb. ternes at \$3.45, Pittsburgh.

Spikes.—The new demand continues very light, and specifications from the railroads are dull. Some of the spike makers are getting short of work, and there is no trouble in getting prompt deliveries on the small amount of new business that is being placed. We quote railroad spikes in base sizes, 5 1/2 x 9/16 in., at \$1.70 to \$1.75, and small railroad and boat spikes in carload and larger lots at \$1.80 to \$1.85 per 100 lb., f.o.b. Pittsburgh.

Bolts and Rivets.—The new demand for bolts and rivets is quiet, consumers limiting their orders to such quantities as are actually needed for current wants. Specifications are only fair, and some of the makers are about caught up on back orders and are able to make prompt deliveries. It is stated that prices of structural and boiler rivets are being slightly shaded in some cases. We quote button-head structural rivets at \$2 and cone-head boiler rivets at \$2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts, which are not firmly held, are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	.80 and 10% off
Small carriage bolts, cut threads.....	.75 and 5% off
Small carriage bolts, rolled threads.....	.75 and 10% off
Large carriage bolts.....	.70 and 2 1/2% off
Small machine bolts, cut threads.....	.75 and 10% off
Small machine bolts, rolled threads.....	.75, 10 and 5% off
Large machine bolts.....	.70 and 7 1/2% off
Machine bolts with C.P.C. and T nuts, small.....	.75 and 5% off
Machine bolts with C.P.C. and T nuts, large.....	.70% off
Square hot pressed nuts, blanked and tapped.....	\$.57 off list
Hexagon nuts.....	\$.63 off list
C.F.C. and R. square nuts, tapped and blank.....	\$.57 off list
Hexagon nuts, 3/4 and larger.....	\$.60 off list
Hexagon nuts smaller than 9/16.....	\$.72 off list
C.P. plain square nuts.....	\$.52 off list
C.P. plain hexagon nuts.....	\$.55 off list
Semi-finished hexagon nuts, 3/4 and larger.....	.85% off
Semi-finished hex. nuts smaller than 9/16.....	.85 and 10% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	.75, 10 and 10% off
Rivets, metallic, tin-plated, bulk.....	3 1/2c. per lb. net extra
Rivets, tin-plated, bulk.....	1 1/2c. per lb. net extra
Rivets, metallic, tin-plated, packages.....	.70, 10 and 10% off
Standard cap screws.....	.75, 10, 10 and 7 1/2% off
Standard set screws.....	.75, 10, 10 and 7 1/2% off

Wire Products.—The seasonable dullness in wire products continues, the new demand from consumers and jobbers for wire and nails being confined to small lots to cover actual needs. Specifications against contracts are being held up to some extent, the trade generally anticipating an early revision in prices. The leading interest has not yet officially changed its prices, but is understood to be meeting the market, when necessary, which is \$1.70 on wire nails in carload and

larger lots, and \$1.50 on plain annealed wire, to jobbers. We quote cut nails at \$1.65; galvanized barb wire, \$2.10 to \$2.20 per 100 lb. and painted \$1.70 to \$1.80 f.o.b. Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

Shafting.—Two makers report a slightly improved feeling in the shafting trade, but so far it is not reflected in an increase in orders, and prices continue weak. We quote cold rolled shafting at 60 per cent. off in carload and larger lots and 55 per cent. in small lots delivered in base territory. On desirable orders, 61 and 62 off are being done in some cases.

Hoops and Bands.—The new demand for both hoops and bands is quiet, as most consumers are covered on contracts against which they are specifying at only a fairly satisfactory rate. The open price on hoops is 1.60c., but on desirable orders 1.50c. is being done. Bands are firm at 1.40c., extras as per the steel bar card.

Cotton Ties.—Some fairly heavy contracts are being taken by the Carnegie Steel Company for cotton ties for delivery over the season at the fixed price of 84c. per bundle, f.o.b., Pittsburgh.

Merchant Steel.—New orders are only for small lots to meet current needs, and specifications are only fair. Leading makers have a good deal of business on their books, but it is not being taken out very promptly. Prices continue weak, and our quotations are being shaded on anything like desirable orders. We quote: Iron finished tire, 1 1/2 x 1/2 in. and larger, 1.40c., base; under 1 1/2 x 1/2 in., 1.55c.; planished tire, 1.60c.; channel tire, 3/4 to 7/8 and 1 in., 1.90c. to 2c.; 1 1/8 in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth, finish, 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Standard Pipe.—It is understood that the Youngstown Sheet & Tube Company has taken a contract from the Hope Natural Gas Company, Pittsburgh, for 180 miles of 12-in. pipe and fittings for a gas line to be laid from the Inez, Ky., field into Louisville. The inquiry for this line came out some months ago. An order for 55 to 60 miles of 4-in. pipe for Western delivery is expected to be placed this week. The new demand for lap-weld pipe continues very heavy, and is still beyond the capacity of the mills to furnish as promptly as wanted. For some little time the pipe mills have been helping each other out on certain sizes in order to try to satisfy customers. The fact that the Sons of Vulcan scale has been signed by three or four of the leading makers of muck bar indicates that the expected shortage in supply of iron pipe may not develop. With actual orders already on their books, and the large amount of new business practically assured, the pipe mills will no doubt be able to run to full capacity the remainder of the year. The new demand for oil-country goods continues heavy, and consumers are pressing the mills hard for deliveries. Discounts on both iron and steel pipe are firmly held.

Boiler Tubes.—The new demand for locomotive tubes continues heavy, and the mills are filled for the remainder of the year. This is also largely true of seamless tubing, and this year will be a record breaker in output and shipments of locomotive tubes and seamless tubes. It is stated that discounts are being firmly held.

Coke.—Reports are current that two or three consumers of furnace coke have covered for their supply for five months commencing August at \$2.50 per net ton at oven, but these reports cannot be verified. If such contracts have been placed they carry the provision that in the event of a decline they will participate in it. The new demand for furnace coke is only fairly heavy, but it is firmly held at \$2.50 per net ton at oven for standard grades running 1 per cent. or under in sulphur. In all there have been sold probably 25,000 tons in the past week. It develops that the Inland Steel Company, Chicago, placed a contract recently with the By-Product Coke Company, of which Pickands, Brown & Co. are the selling agents, for about 60,000 tons, or enough to run one of its furnaces for the next four months, its other stock being idle for relining and repairs. The price paid for this coke was based at \$2.15 at oven, Connellsville, which, with a freight of \$2.50, would make the coke cost the buyer \$4.65 delivered, the coke being made in the Chicago district. Some brands

of furnace coke that are not regarded as strictly standard in quality are being sold at \$2.25 to \$2.35 at oven. The demand for foundry coke is quiet and prices are only fairly strong. For standard makes, \$3 per net ton at oven is quoted, but some makes are being sold as low as \$2.75 to \$2.85 at oven. We quote standard Connellsville furnace coke for prompt shipment at \$2.50, and other grades as low as \$2.25, per net ton at oven. Standard makes of 72-hour foundry coke are fairly strong at \$2.75 to \$2.85 for prompt shipment and from \$2.85 to \$3 on contracts for remainder of the year. The Connellsville Courier reports the output of coke in the Upper and Lower Connellsville regions for the week ending July 19 as 399,704 net tons, an increase over the previous week of a little over 9000 tons. Several coke makers claim that these figures are too high, and that the output of coke in the Connellsville regions in July was about 25 per cent. less than in June.

Old Material.—The better feeling in the scrap trade noted for several weeks is still largely one of sentiment, but it is a fact that consumers are showing more interest than for some time. They are making offers to dealers at lower prices than the latter will accept, but these offers are taken to indicate that their stocks are low and they will soon have to buy. There have been sales in the past week of 5000 to 6000 tons of heavy steel scrap at about \$12.50, delivered at buyers' mills, while for selected heavy steel scrap \$13 has been paid. The new demand for turnings is heavier and prices are slightly higher. We note a sale of 700 tons of borings at about \$8.25, delivered, and 1200 to 1500 tons of turnings at \$6.75, delivered. One leading consumer of turnings has shut off shipments for the time being. We also note a sale of 500 tons of low phosphorus melting stock at \$15.75, delivered. The scrap lists of railroads are heavier than usual. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

* Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$12.75 to \$13.00
Ordinary steel scrap	12.25 to 12.50
† Compressed side and end sheet scrap	10.50
No. 1 foundry cast	12.75 to 13.00
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to 14.75
No. 1 railroad malleable stock	11.50 to 11.75
Grate bars	8.25 to 8.50
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	24.50 to 25.00
Steel car axles	17.50 to 17.75
Locomotive axles, steel	21.00 to 21.50
Locomotive axles, iron	25.50 to 26.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	7.50 to 7.75
Old carwheels	13.75 to 14.00
* Marine shop turnings	6.75 to 8.00
* Cast-iron borings	8.25 to 8.50
† Sheet bar crop ends	14.00 to 14.25
Old iron rails	14.50 to 14.75
No. 1 railroad wrought scrap	13.75 to 14.00
Heavy steel axle turnings	9.00 to 9.25
Stove plate	8.25 to 8.50

* These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

† Shipping point.

Chicago

CHICAGO, ILL., July 30, 1913.—(By Telegraph.)

Governing conditions in this market at the present time are best indicated by the unlikelihood of their fostering an expanding market in the remainder of the year. The important factor is lack of money. At Chicago the period of greatest money stress, one evidence of which was the wholesale holding up of pig-iron shipments during the months of May and June, resulting in an accumulation of stocks approximating 20,000 tons on more than one Chicago district furnace yard, is undoubtedly past in fact, but remains in influence a restraining injunction against anything but strict conservatism. Buying for development work or new projects is accordingly at a minimum. In two directions activity may be noted. Agricultural implement interests are still engaged in covering for their various needs for the new year upon which they have entered. Steel bars, sheets, structural shapes, pipe, bolts and castings are being secured by contracts, in one instance to the extent of 75,000 tons, in another 25,000 tons, but this is drawing to a close and has been conducted with a conservatism more or less conspicuous. In the other direction both gray iron and malleable foundries appear to be hampered only by labor shortage in pushing their production to a maximum. July will doubtless show very

heavy shipments of iron to melters, and it is stated that current bookings of orders for castings are keeping pace with the rate of melting. The pig-iron buying movement, still under way in this market, has so fortified local furnaces, for the next quarter at least, as to warrant a general advance in quotations of about 50c. above the low point. The furnace position is strong, however, only on the basis of a considerably reduced production. Steel mill conditions grow steadily easier. Those who are able to buy in a wide market advise that with the exception of tin plate and certain grades of sheets it is possible to secure delivery of any mill products within 30 days. Price weaknesses, the accompaniment to easier mill conditions, are still confined to sheets, wire products, track fastenings and some forms of rerolled materials with an additional recognition of the general situation in sheets by a reduction in store price of \$2 a ton on blue annealed and \$3 a ton on black and galvanized. Concerning the price of steel bars the basis for recent contracting is supported by much more generous bookings for future delivery than is true of any other of the finished steel lines. The local situation with reference to scrap presents a dealers' market, in which speculative efforts to artificially advance prices are not entirely lacking.

Pig Iron.—Sales the past week are reported to have exceeded in aggregate tonnage the liberal purchases of the preceding week. There remains of inquiries still unclosed in the neighborhood of 12,000 tons. In contrast to previous buying there were fewer single lots of large tonnage and a more general buying in quantities from 500 to 1500 tons. Demand was well distributed among all grades of iron, and with the exception of Lake Superior charcoal, offers on which were quite generally solicited on the basis of \$15.25, Chicago, for desirable tonnage, quotations indicated that local furnaces were rapidly losing their interest in low-priced iron. About the middle of the week one interest advanced its minimum for No. 2 X malleable Bessemer and basic iron to \$15, f.o.b. furnace, with No. 1 standard foundry and higher silicon irons on the basis of \$15.50. Except for outstanding quotations the general market is reflected in this advance. The lower prices are likewise disappearing among quotations for Southern iron, and \$10.50, Birmingham, appears to be available only for immediate shipment, and then from resale sources rather than direct from furnaces. The pig-iron trade seems to have recovered completely from the stagnation of May and June. Quite as satisfactory as the buying is the urgent demand for shipments now making inroads on the stocks previously accumulated by the furnaces. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4....	\$15.25 to \$16.25
Northern coke foundry, No. 1.....	15.25 to 15.75
Northern coke foundry, No. 2.....	14.75 to 15.25
Northern coke foundry, No. 3.....	14.25 to 14.75
Southern coke, No. 1 foundry and No. 1 soft	15.35 to 15.85
Southern coke, No. 2 foundry and No. 2 soft	14.85 to 15.35
Southern coke, No. 3.....	14.35 to 14.85
Southern coke, No. 4.....	13.85 to 14.35
Southern gray forge.....	13.85 to 14.35
Southern mottled.....	13.85 to 14.35
Malleable Bessemer.....	14.75 to 15.25
Standard Bessemer.....	18.40
Basic.....	14.75 to 15.25
Jackson Co. and Kentucky silvery, 6 per cent.....	20.40
Jackson Co. and Kentucky silvery, 8 per cent.....	21.40
Jackson Co. and Kentucky silvery, 10 per cent.....	22.40

(By Mail)

Rails and Track Supplies.—Orders for tie plates and other track repair material to replenish the low stocks of the railroads and further indications of preparation for next year's extension work, with specific inquiry from one road for its rails for 1914, serve to brighten the outlook. Buyers continue to insist on immediate delivery. The Memphis, Dallas & Gulf Railroad has purchased 8000 tons of steel rails to be used in the extension of its line. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots. Chicago; tie plates, \$32 to \$34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c. 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—There is a noticeable absence of large contracts for structural material, though smaller orders show an increase, and fabricators are able to make better deliveries. The American Bridge Company has the contract from the Minnesota Steel Company for 500 tons to be used in a coal storage building for the coke plant at Duluth, Minn. The

Arkansas & Memphis Bridge & Terminal Company has let 300 tons to the Southern Iron Works, Memphis, Tenn., for shafting, locks, doors, etc., for the Memphis bridge. The Ralston Iron Works will furnish 300 tons to be used for the Burnett apartments, San Francisco, Cal. Levering & Garrigues were awarded 950 tons to be used in the Mills Building, San Francisco. The Prairie Oil & Gas Company bought 350 tons for pump and gate houses at Shannondale, Mo., Centralia, Mo., Wellsville, Mo., and Moscow, Mo., and 450 tons were placed by Sioux City, Iowa, for a high school building. Highway spans for Shasta County, California, requiring 350 tons have been changed to reinforced concrete. The Chicago Steel Products Company has been awarded the contract for the structural steel for the extension to the Northwest station of the Commonwealth Edison Company, approximating 2500 tons. For mill shipment Chicago delivery we quote 1.63c.

The demand for structural shapes out of store is quite active. We quote for Chicago delivery from store 1.95c.

Plates.—The demand for plates is very quiet, with increasing promptness in deliveries. Specifications for any sizes may now be completed within 30 days. The only inquiry of any consequence in the market is from the Southern Railway for 1500 cars. For Chicago we quote for delivery from mill, 1.63c.

The buying of plates from jobbers is very light, prompter deliveries which the mills are now making being felt. We quote for Chicago delivery from store 1.95c.

Bars.—Specifications against contracts for steel bars have not yet begun to appear freely. The leading implement interest is now figuring on its requirements of bars, piping and other finished steel products, the total of which will aggregate in the neighborhood of 75,000 tons. Steel bar mills are already well booked up, the future being much more clearly defined on bars than on any other of the finished steel products. The buying of bar iron is reported as more active during the week with little or no pressure to break the local mill price of 1.50c. We quote for mill shipment as follows: Bar iron, 1.50c. to 1.55c.; soft steel bars, 1.58c.; hard steel bars, 1.60c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

Jobbers report satisfactory volume of business in bars with those for reinforcing work in greatest demand. For delivery from store, we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes $\frac{3}{4}$ in. and over, and usual card extras for smaller sizes; shafting 53 per cent. off.

Sheets.—The local market shows the most decided weakness of any of the steel products. Mills are seeking business aggressively and prompt deliveries from mill have brought out lower prices from stores. Buying is of a hand-to-mouth variety and on the part of the manufacturers is of a most conservative character. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.48c. to 2.53c.; No. 28 galvanized, 3.43c. to 3.58c.; No. 10 blue annealed, 1.93c.

Chicago jobbers have announced a reduction of \$2 a ton on blue annealed sheets and of \$3 on black and galvanized. The new store prices, due to better mill deliveries, are as follows: No. 10 blue annealed, 2.15c.; No. 28 black, 2.75c.; No. 28 galvanized, 4c.

Rivets and Bolts.—It is reported that the large implement company mentioned in our last report has closed for its requirements though for a less amount than was anticipated. Most of the implement interests have purchased and new business is in scattered lots and is being aggressively sought. The market is weak with no immediate prospect of betterment. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 75-10-2 $\frac{1}{2}$; cut thread, 75-7 $\frac{1}{2}$; larger sizes, 70-7 $\frac{1}{2}$; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 75-10-7 $\frac{1}{2}$; cut thread, 75-10-2 $\frac{1}{2}$; large size, 70-10; coach screws, 80-12 $\frac{1}{2}$; hot pressed nuts, square head, \$5.70 off per cwt.; hexagon, \$6.30 off per cwt. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 2.08c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to $\frac{3}{4}$ x 4 in., 70-7 $\frac{1}{2}$; larger sizes, 65-5; carriage bolts up to $\frac{3}{4}$ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

Wire Products.—New business is almost wholly confined to actual necessities, while continued shading of prices is evident. Our quotations, which are on business with jobbers, are nominal, sales being at \$1 to \$2 a ton less; plain wire, No. 9 and coarser, base, \$1.78; wire nails, \$1.98; painted barb wire, \$1.98; galvanized, \$2.38; polished staples, \$1.98; galvanized, \$2.33, all Chicago.

Cast-Iron Pipe.—New contracts for pipe include the award of 1500 tons at Columbus, Ohio, to the United States Cast Iron Pipe & Foundry Company; 300 tons at Fergus Falls, Minn., to the American Cast Iron Pipe Company, Birmingham, and 500 tons at Canton, Ohio, to the Massillon Iron & Steel Company, Massillon, Ohio. Columbus, Neb., is in the market for about 400 tons and Lincoln, Neb., is taking prices on 300 tons. Bids on new specifications issued at Springfield, Ohio, have been opened but no award was made. No change in price is noted. We continue to quote as follows per net ton, Chicago: Water pipe, 4-in., \$28; 6 to 12-in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

Old Material.—Further strength is to be noted in the scrap market, due largely to buying on the part of dealers which reflects speculative conditions. Melters are not making any particular effort to protect themselves against an advance, the bulk of their buying being confined to instances where prices meet their views or in response to demands for immediate requirements. Railroad offerings are being absorbed as a whole, with an indication that on some items they are holding for better bids. For this week railroad lists total approximately 10,500 tons: Michigan Central, 2300 tons; Chicago, Rock Island & Pacific, 3150 tons; Chicago, Burlington & Quincy, 2000 tons, and a list of the Standard Oil Company totaling 300 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	.....\$14.00 to \$14.50
Old steel rails, rerolling	.....12.25 to 12.50
Old steel rails, less than 3 ft.	.....11.25 to 11.75
Relaying rails, standard section, subject to inspection	.....24.00
Old carwheels	.....12.75 to 13.25
Heavy melting steel scrap	.....10.50 to 10.75
Frogs, switches and guards, cut apart	.....10.50 to 10.75
Shoveling steel	.....10.25 to 10.50
Steel axle turnings	.....7.25 to 7.75

Per Net Ton.

Iron angles and splice bars	.....\$13.25 to \$13.75
Iron arch bars and transoms	.....13.50 to 14.00
Steel angle bars	.....10.00 to 10.25
Iron car axles	.....19.50 to 20.00
Steel car axles	.....16.50 to 17.00
No. 1 railroad wrought	.....10.75 to 11.25
No. 2 railroad wrought	.....10.25 to 10.50
Cut forge	.....10.25 to 10.50
Steel knuckles and couplers	.....10.00 to 10.25
Steel springs	.....10.50 to 11.00
Locomotive tires, smooth	.....11.50 to 12.00
Machine shop turnings	.....5.00 to 5.50
Cast and mixed borings	.....5.00 to 5.50
No. 1 busheling	.....9.00 to 9.50
No. 2 busheling	.....6.75 to 7.25
No. 1 boilers, cut to sheets and rings	.....7.25 to 7.75
Boiler punchings	.....11.75 to 12.25
No. 1 cast scrap	.....10.75 to 11.25
Stove plate and light cast scrap	.....9.25 to 9.75
Railroad malleable	.....10.50 to 11.00
Agricultural malleable	.....9.25 to 9.75
Pipes and flues	.....7.50 to 8.00

Philadelphia

PHILADELPHIA, PA., July 29, 1913.

General Sentiment Is Better.—Prices of foundry iron have taken a brace. In fact, several sellers are quoting prices ranging from 50c. to \$1 a ton above recent minimum quotations. Sales of basic iron have been made at slightly above \$15, delivered. The finished material market continues irregular. In some lines business comes in freely, but in others current orders do not exceed over 50 to 75 per cent. of capacity. Mill operations range from 85 per cent. to full capacity. While dullness is expected in midsummer, more active buying is looked for by September. The coke market remains firm. Old material is very quiet.

Iron Ore.—Buyers being well supplied, they show no interest in the market. Deliveries are at a heavier rate than consumption, and stocks are accumulating. Importations during the 10 days ended July 27 included, 12,350 tons from St. John's; 25,953 tons from Sweden; 4146 tons from Spain; 3400 tons from Venezuela; 5000 tons from New Brunswick, and 21,400 tons from Cuba.

Pig Iron.—Producers are holding prices of foundry grades more firmly. The market for standard brands of No. 2X appears bottomed at \$15.50 delivered in buyers' yards in this vicinity, although on recent transactions, on which competition was sharp, that basis was shaded a few cents. At the same time other sellers have been making sales in moderate lots at \$16, delivered, and one Lehigh Valley producer, which has but 2 out of 8 furnaces active and has been selling at \$15.75, delivered, has advanced the price for No. 2X

to \$16 furnace, equal to \$16.75 delivered here, on shipments extending over the remainder of the year. Little buying for forward account has been recently closed in this market, the bulk of the sales being for delivery over the remainder of the third quarter. Some furnaces are sold up for August, and in a number of instances will carry undelivered July orders over into next month. Current business in the foundry grades has been usually in small lots. Several 1000-ton inquiries are still under negotiation. There has been a more active movement in Virginia foundry. Transactions are more generally on a basis of \$13 at furnace for No. 2 X and \$12.75 for No. 2 plain, although some sellers still hold at \$13.50 for the former grade. Some good inquiries for Virginia foundry have been received from consumers in the West, but present quotations are above a competitive basis. Cast-iron pipe makers have been doing some scattered buying. One melter would take on 2000 tons at a price, while sales of 1000 and 500 tons of Pennsylvania low grade have been made at \$14.50 to \$15, delivered, according to grade. Odd sales of rolling mill forge have been made at \$14.50 to \$14.75, delivered. The bulk of the recently pending business in charcoal foundry iron has been closed. Small sales of malleable pig have also been made. Negotiations for basic iron, which have been under way for several weeks by a central Pennsylvania consumer, have resulted in purchases of some 6000 tons for third and fourth quarter delivery, at slightly better than \$15, delivered. Inquiries involving several thousand tons, understood to be for basic of somewhat special analysis, for delivery outside this district, are under negotiation. Moderate sales of low phosphorus pig are being made at \$23 delivered for 0.035, and \$23.50 for 0.034, while Lebanon low phosphorus is quoted at \$18.50 to \$19 at furnace. Prices generally show a somewhat wider range, although quotations are unchanged. Concessions are harder to obtain, but are sometimes available, particularly when freight rates favor the buyer. The following range of prices is named for standard brands for third quarter delivery in buyers' yards in this immediate vicinity:

Eastern Pennsylvania No. 2 X foundry.....	\$15.50 to \$16.00
Eastern Pennsylvania No. 2 plain.....	15.25 to 15.50
Virginia No. 2 X foundry.....	15.80 to 16.30
Virginia No. 2 plain.....	15.55 to 15.75
Gray forge.....	14.50 to 14.75
Basic.....	15.00 to 15.25
Standard low phosphorus.....	23.00 to 23.50

Ferroalloys.—A sale of 100 tons of 80 per cent. ferromanganese at \$58.50 for extended delivery and some smaller sales at about \$58, seaboard, are reported, but the demand is unimportant. Importations of ferromanganese at this port last week totaled 624 tons. There has been little movement in ferrosilicon.

Billets.—Sales have not been large. Business is confined to prompt lots running up to 500 tons. Some fair tonnage is still pending. Specifications are coming to mills freely, and operations continue at full capacity. The general demand is seasonably dull. Prices are unchanged, basic open-hearth rolling billets being quoted in small prompt lots at \$28.90, delivered, and \$28 for ordinary tonnages. Forging billets are firm at \$34, mill, for ordinary analysis specifications.

Plates.—Some mills continue to report new business slightly in excess of shipments, while others have not been so favored. Orders for small lots are accompanied by immediate specifications. Tank plates are in fair demand, while specifications against orders for ship plates are good. Considerable ship plate business is pending. Prices are maintained at 1.60c. to 1.65c., the latter being the minimum quotation by the leading Eastern mills.

Structural Material.—Current business has been largely of a miscellaneous character. In fabricated work some small building and bridge work has been closed. Fabricated prices are reported as being still easy. Local engineers are taking bids on 300 tons for a power house in the western part of the State. A moderate volume of business is moving in plain shapes, which are quoted at 1.60c., delivered here. Mill operations are not quite so heavy, with rolling schedules more open.

Sheets.—Eastern mills continue to receive orders, mostly of a day-to-day character, in good number, and in the aggregate order books show a moderate gain. Consumers continue to urge deliveries. Mills are operating at full capacity, but the heated term has reduced the output to some extent. Prices are firm at 1.90c. for Western No. 10 blue annealed sheets, delivered in this territory, with Eastern mills making smooth, loose-rolled sheets occasionally obtaining 1.95c. for spot deliveries.

Bars.—A moderate volume of business is moving in iron and steel bars. Mill operations are comparatively

good. Prices of steel bars are firm at 1.55c., delivered here, with some contracting at that basis. Ordinary iron bars are easy at 1.35c. to 1.40c., mill, equal to 1.42½c. to 1.47½c., delivered here.

Coke.—The market continues strong, with a moderate amount of business moving at unchanged prices. Sales of some 4000 tons of contract furnace coke at \$2.50 at oven have been made, with smaller sales of prompt at \$2.50 to \$2.60. A fair movement in foundry coke is noted at \$3 to \$3.15 at oven for standard brands. The following range is named, per net ton, for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$4.25 to \$4.65
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	4.00 to 4.25
Mountain foundry coke	4.50 to 4.75

Old Material.—Actual business is in very small volume, being confined to odd lots and transactions among dealers. Consumers show practically no interest in the market. Some mills do not seem willing to take on additional material at bargain prices. Considerable interest is being shown by dealers in the month's offerings by the railroads. In the absence of business quotations are entirely nominal. An approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to \$1.35 per gross ton, is as follows:

No. 1 heavy melting steel.....	\$11.25 to \$11.50
Old steel rails, rerolling (nominal).....	14.00
Low phosphorus heavy melting steel scrap (nominal)	14.50 to 15.00
Old steel axles (nominal)	17.50 to 18.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.50 to 14.00
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	9.50 to 10.00
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00
Wrought turnings	7.75 to 8.00
Cast borings	7.75 to 8.00
Machinery cast	13.00
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	11.50 to 12.00

Cincinnati

CINCINNATI, OHIO, July 30, 1913.—(By Telegraph.)

Pig Iron.—Reports from agencies in other markets are more encouraging than those issued here. However, there are several inquiries from nearby consumers, indicating an increase in activity among outside melters of foundry iron. The molders' strike in Cincinnati has stopped the consumption of iron in all but four foundries, and, while few cancellations have been made, practically all shipments have been held up. The inquiries mentioned include one for 3000 tons of foundry iron, equally divided between Northern and Southern brands, and the next larger calls for 1000 tons of Southern foundry, both for shipment this year. With the exception of about 10,000 tons of basic sold to a Central Western steel works, there is little to report in the way of sales in this immediate territory, although many small consumers of foundry iron in Indiana and southern Ohio are contracting for a supply to last them through the year. Southern prices are firmer, and while on a desirable tonnage \$10.50, Birmingham, could probably be done for shipment through the remainder of this year, the majority of producers are holding out for 25 to 50c. a ton higher for last quarter delivery. Northern iron is not strong, and \$14, Iron-ton, can be done for any shipment this year, with this quotation not confined to speculative dealers. Both basic and malleable have also reached the same level, and this is generally considered to be bedrock by both buyer and seller. There is no change in Ohio silvery iron prices, and business is quieter. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft..	\$14.25 to \$14.75
Foundry coke, No. 2 foundry and 2 soft..	13.75 to 14.25
Southern coke, No. 3 foundry.....	13.25 to 13.75
Southern, No. 4 foundry	12.75 to 13.25
Southern gray forge	12.25 to 12.75
Ohio silvery, 8 per cent. silicon.....	18.70 to 19.20
Southern Ohio coke, No. 1.....	16.20 to 16.70
Southern Ohio coke, No. 2.....	15.20 to 15.70
Southern Ohio coke, No. 3.....	14.95 to 15.45
Southern Ohio malleable Bessemer.....	15.20 to 15.45
Basic, Northern	15.20 to 15.45
Lake Superior charcoal	18.75 to 19.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Producers in the Connellsville district have been able to maintain a minimum of \$2.50 per net ton at oven, on standard brands, for either prompt or future shipment furnace coke. There is not much business reported, but August sales are expected to run ahead of July, as the furnace operators have not come to the conclusion that they will have to face the inevitable and pay a price for 48-hr. coke that last year would have been considered prohibitive. The Pocahontas and Wise County quotations are almost equally as strong, it being doubtful if any considerable business could be placed below \$2.50. Foundry coke is moving rather slowly. Local foundries are not consuming any quantity to speak of, and, while nearby outside foundries are consuming more than for some time, most of them have contracted ahead. Foundry coke in all three fields ranges from \$2.90 to \$3.10 per net ton at oven.

Finished Material.—For immediate shipment No. 2 galvanized sheets are quoted at 3.30c., Pittsburgh basis, and black sheets at 2.25c. On contracts calling for advanced shipment dates the local mill is not disposed to make any cuts in previous quotations. Contrary to expectations, new orders for both black and galvanized sheets are said to be holding up better than in other markets. Local warehouses report that their July business will about equal in volume that transacted in the month of June, which is considered a very good showing if the labor troubles are taken into consideration. However, considerable of this business has been coming from nearby localities. The warehouse price of steel bars is from 1.95c. to 2c. and on structural material 2.05c. to 2.10c.

Old Material.—While there is a small demand from nearby foundries for scrap material, none is disposed to buy for future shipment. The local foundries are still shut down and are not able to take care of scrap iron previously contracted for. The rolling mills in this territory are not disposed to make any contracts at the present time. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f. o. b. at yards:

Per Gross Ton.

Bundled sheet scrap	\$7.25 to \$7.75
Old iron rails	12.25 to 12.75
Relaying rails, 50 lb. and up	19.75 to 20.25
Rolling steel rails	11.25 to 11.75
Melting steel rails	9.50 to 10.00
Old carwheels	11.00 to 11.50

Per Net Ton.

No. 1 railroad wrought	\$9.25 to \$9.75
Cast borings	4.75 to 5.25
Steel turnings	4.75 to 5.25
No. 1 cast scrap	9.00 to 9.50
Burnt scrap	6.50 to 7.00
Old iron axles	16.75 to 17.25
Locomotive tires (smooth inside)	10.25 to 10.75
Pipes and flues	6.00 to 6.25
Malleable and steel scrap	7.50 to 8.00
Railroad tank and sheet scrap	4.75 to 5.25

Boston

BOSTON, MASS., July 29, 1913.

Old Material.—Neither dealers, producers nor consumers can see any change in the scrap market. Few sales are being made. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f. o. b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$8.75 to \$9.00
Low phosphorus steel	13.50 to 14.50
Old steel axles	13.50 to 14.00
Old iron axles	21.00 to 21.50
Mixed shafting	13.00 to 13.25
No. 1 wrought and soft steel	10.50 to 10.50
Skeleton (bundled)	7.50 to 8.00
Wrought-iron pipe	8.50 to 9.00
Cotton ties (bundled)	8.50 to 9.00
No. 2 light	3.50 to 4.00
Wrought turnings	5.25 to 5.50
Cast borings	5.25 to 5.50
Machinery, cast	11.50 to 12.00
Malleable	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	6.75 to 7.00
Cast-iron carwheels	13.50 to 14.00

Cleveland

CLEVELAND, OHIO, July 29, 1913.

Iron Ore.—Ore is coming freely from the mines and the movement this week will be very heavy. Contract vessels are taking care of about all of the shipments, but it is expected that there will be some cargoes for wild carriers before the week is over. One 3000-ton sale of non-Bessemer ore was made, this being the first transaction for some time. Some other small lot business is in prospect. We quote prices as follows: Old range Bessemer \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

Pig Iron.—A moderate volume of business in foundry grades is coming out and a feeling among producers is better than for some time. This is largely due to the continued heavy consumption. The Cleveland Furnace Company has advanced its prices to \$14.50 for No. 2 foundry for outside shipment and \$15, delivered Cleveland. This company, however, is well sold up for some time. One or two other sellers are talking of advancing their quotations. However, there is no indication of an immediate general advance in selling prices. Foundry iron is still being offered at \$13.75, Cleveland and Valley furnace, for the last half and \$14.50, delivered Cleveland, represents the local market. We note the sale of 800 tons of foundry iron over 2.20 in silicon and under 0.04 in sulphur to a northern Ohio manufacturer at \$13.75, Cleveland. A similar quotation was made by a Valley producer. Among the inquiries for foundry iron is one from Mansfield, Ohio, for 400 tons and another from Erie, Pa., for 500 tons. There is little inquiry for Southern grades, but prices are firm, \$10.50, Birmingham, being the minimum quotation for No. 2. Some sellers that are making that price for spot shipment are asking 25c. to 50c. a ton more for the last quarter and last half delivery. Perry furnace of Pickands, Mather & Co., at Erie, Pa., which has been out of blast for relining, is scheduled to be blown in next week. The stack of the Globe Iron Company, Jackson, Ohio, which has been idle since June 1, 1912, for extensive repair, has gone in blast on silvery iron. For prompt shipment and for last half we quote, delivered Cleveland, as follows:

Bessemer	\$16.65
Basic	15.25
Northern No. 2 foundry	\$14.50 to 14.75
Southern No. 2 foundry	14.85 to 15.15
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	20.55

Coke.—The market is very firm on both grades. Some additional foundry contracts are being placed by consumers who have been holding off in the hope of getting lower prices. We quote standard make of foundry coke at \$2.75 to \$3.10 per net ton at oven for prompt shipment and \$3 to \$3.10 for contract. The price on furnace grades is being maintained at \$2.50.

Finished Iron and Steel.—Specifications are holding up well and consumers continue to crowd the mills for shipments in spite of the fact that there has been a general improvement in deliveries. New business, however, is light. A few contracts for steel bars and structural material are being placed for the last quarter and first quarter delivery at current prices. One or two of the implement makers in this territory who have not previously placed contracts are inquiring for steel. The leading producer of sheets has met market conditions and reduced prices to 2.25c. for No. 28 black, 3.30c. for No. 28 galvanized, and 1.65c. for No. 10 blue annealed for early delivery. It is stated that it is taking no contracts at these prices, which may be withdrawn any time. There is a good demand for small lots of structural material for early delivery, but some of the mills are still unable to make the shipment required, although deliveries on this class of material have improved considerably. New structural work which has come out includes 1100 tons for freight car repair shops at Ashtabula and 1000 tons for shops at Air Line Junction for the Lake Shore Railroad, and 375 tons for reinforcing arches for the Superior Avenue bridge, Cleveland. Bar iron is in light demand. We quote iron bars at 1.50c. Cleveland. The demand for bolts is only moderate and prices are weak. Light rails are in good demand. While prices on wire and nails are weak, the leading interest has not reduced quotations. Warehouse prices are unchanged at 2c. for steel bars and 2.10c. for plates and structural material.

Old Material.—While the market is still dull, an optimistic feeling has developed among dealers who look

forward to an improvement in the demand and possibly better prices in August. Because of this feeling, dealers are refusing to sell material short. However, consumers apparently do not expect higher prices soon, as they are buying very little material for future delivery. While quotations are no higher, bargain lots are no longer plentiful. We quote f. o. b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	14.50 to 15.00
Steel car axles	17.00 to 17.50
Heavy melting steel	10.75 to 11.00
Old carwheels	12.50 to 13.00
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable	10.00 to 10.50
Railroad malleable	11.00 to 11.50
Light bundled sheet scrap	9.00 to 9.50

Per Net Ton.

Iron car axles	\$20.00 to \$21.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings.....	4.25 to 4.50
Steel axle turnings	7.00 to 7.50
No. 1 busheling	9.50 to 9.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 cast	11.00 to 11.50
Stove plate	8.50 to 8.75
Bundled tin scrap	10.00 to 10.50

Birmingham

BIRMINGHAM, ALA., July 28, 1913.

Pig Iron.—The Alabama iron market is stronger than it has been in several months. The volume of business closed recently has been quite extensive and none of it on a basis below \$10.50, which apparently has been established as the absolute minimum, even in competitive territory. The minimum for sales in Southern territory is \$10.75, while several furnace interests continue to hold and to sell at \$11. A lot of manganese iron sold at \$12. Reported sales consist of over 10,000 tons, in lots of carloads up, mostly for early delivery. A sale of 3000 tons was made for delivery over the rest of the year at a little over \$10.50. Many small sales were made on the \$11 basis. Most of the iron that has been sold was disposed of in Southern territory, where foundry operations are on the increase, due to several new industries, but there were also good Chicago sales. It is understood that the interest quoting \$10.50 for the rest of the year has disposed of considerable of its accumulations. The basis of the reported sale of 20,000 tons for export is not given. The market is rather buoyant and constant betterment is expected from now on. Southern consumption will largely take care of the situation in foundry iron. We continue to quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	\$11.00 to \$11.50
No. 2 foundry and soft	10.50 to 11.00
No. 3 foundry	10.00 to 10.50
No. 4 foundry	9.75 to 10.25
Gray forge	9.50 to 10.00
Charcoal	24.00 to 25.00

Cast Iron Pipe.—Manufacturers report nothing of special interest. Few municipal bond sales of any consequence have occurred, and large pipe orders are scarce. Local plants are, however, operating on good time and pipe is moving as manufactured, owing to the accumulation of orders for extensions and repairs. We continue to quote 4-in. at \$22 and 6-in. and upward at \$20 per net ton, f.o.b. pipe yards.

Coal and Coke.—The coke market is strong. The Tennessee Company has secured an order for 20,000 tons for the New Orleans power plant and other orders in proportion have been taken by other dealers. Foundry coke, per net ton at oven, is quoted at \$3.50 to \$4 and furnace coke at \$2.75. All coke mines are in operation to capacity.

Old Material.—The market is without feature. There is a trifle more inquiry, but movements have not increased. The outlook is possibly somewhat improved. Nominal quotations, per gross ton, f.o.b. dealers' yards, are as follows:

Old iron axles (light)	\$15.00 to \$15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

Feeling Better in British Trade

South Africa Has Bought 25,000 Tons of Rails
—Steelmasters' Association May Dissolve

(By Cable)

LONDON, ENGLAND, July 30, 1913.

The Cleveland ironmasters have adjourned their warrant conference for six weeks but are determined that warrant stores shall be abolished. It is proposed now to appoint a committee to fix prices daily. The general feeling is rather better, but the disruption is threatened of the British Steelmasters' Association, owing to internal dissensions and the secession of two Scotch makers. South Africa has bought 25,000 tons of rails. Herr Schallerbrand has resigned from the Stahlwerks Verband to become general manager of the Bohenhohe Spelter Works. Stocks of pig iron in Connal's stores are 195,070 tons against 199,034 tons last week. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 55s. 2½d. (\$13.44), an advance of 1d. (2c.) over a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlebrough, 56s. 6d. (\$13.76), against 55s. 6d. (\$13.52) a week ago.

Ferromanganese, £11 2s. (\$54.02) f.o.b. shipping port. Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.11), a decline of 5s. (\$1.22).

German sheet bars, f.o.b. Antwerp, 87s. 6d. (\$21.29).

German 2-in. billets, f.o.b. Antwerp, 80s. (\$19.46).

German basic steel bars, f.o.b. Antwerp, £4 14s. (\$22.87), an advance of 1s. (24c.).

French blooms, 77s. (\$18.73), f.o.b. shipping port.

French sheet bars, 82s. 6d. (\$20.07), f.o.b. shipping port.

Steel bars, export f.o.b. Clyde, £6 17s. 6d. (\$33.46).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, 10s. (\$31.63).

German joists, f.o.b. Antwerp, £5 12s. to £5 15s. (\$27.25 to \$27.98).

Steel ship plates, Scotch, delivered local yards, 8 7½d. (\$40.76).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s. (\$45.02).

Steel rails, export, f.o.b. works port, £6 12s. 6d. (\$32.24).

Tin plates, cokes, 14x20, 112 sheets, 108 lb., f.o.b. Wales, 13s. (\$3.16).

St. Louis

ST. LOUIS, MO., July 28, 1913.

A more active state of affairs prevails in the iron and steel markets here, though conservatism is still noticeable so far as future commitments are concerned. However, aggregates are good and the outlook in all divisions is more optimistic, even the scrap market having begun to show evidences of greater courage.

Pig Iron.—The demand for pig iron the past week seemed to be even more general, but the individual quantities continue rather small, indicating that the purchasers are buying for approximately immediate needs and waiting for more definite tendencies in the market before contracting for large lots far ahead. Moreover, the furnace representatives are declining to consider any business beyond the last quarter, though there have been a number of tentative inquiries, regarded more as feelers than anything else, for the first quarter and first half of next year. Sales during the week aggregated from 8000 to 10,000 tons all in small lots as noted, the largest being 800 tons divided among three furnaces to get a suitable mixture. The inquiries outstanding indicate a considerable aggregate of orders to be placed during the coming week. The latest sales reports today include 700 tons of charcoal iron, 400 tons of high silicon and 1000 tons of ferromanganese. A new inquiry is for 2000 tons of steel billets for the Alton Steel Company.

Finished Iron and Steel.—New business has shown possibly a 10 per cent. increase, while further evidence has accumulated that there is considerable tonnage, not immediately required, being banked up to await future developments. Requests for prompt shipments on contracts continue very urgent in structural material, fabricating shops are busy and there is no excessive accumulation of material in their yards. A considerable number of small jobs are beginning to appear. In standard rails sales include about 7500 tons

of 60 lb. for a Southwestern road and 3500 tons released by the Frisco receivers on a remainder of 10,000 tons of an existing contract closed before the receivership. Track fastenings have been in excellent request. In light rails there has been a good demand, especially among the coal interests, which, apparently, are preparing for an active winter's business. Lumber interests are very quiet. Reinforcing bars are in excellent demand, the principal contract of the week was one of 4000 tons of twisted bars for Montgomery Ward & Co.'s building at Kansas City. Small lots are being sought actively. Ordinary bars are being taken as fast as they can be delivered, the wagon and agricultural interests maintaining their busy state. Warehouse sales are reported very good at firm prices, while generally the movement of material of all sorts is better than for the past two weeks.

Old Material.—The scrap market shows some change in temper, though little in price. Dealers are about ready to begin laying down material in their yards against future needs and they are selling a little to foundries. Until pig iron moves up a little, however, activity will not be very accentuated. Most mills are out of the market and still under embargo on contract deliveries. One industry is reported in the market for about 5000 tons of steel, but aside from this there is no exceptional demand. Relayers are still hard to get and many orders remain unfilled. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$11.00 to \$11.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than three feet	10.00 to 10.50
Relaying rails, standard section, subject to inspection	23.00 to 24.00
Old car wheels	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Frogs, switches and guards cut apart	9.75 to 10.25

Per Net Ton.	
Iron fish plates	\$10.50 to \$11.00
Iron car axles	18.50 to 19.00
Steel car axles	14.50 to 15.00
Wrought arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.75 to 9.25
Railroad springs	7.50 to 8.00
Steel couplers and knuckles	7.50 to 8.00
Locomotive tires, smooth	10.00 to 10.50
No. 1 dealers' forge	6.00 to 6.50
Mixed borings	3.00 to 3.50
No. 1 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	7.00 to 7.50
Railroad malleable	7.50 to 8.00
Agricultural malleable	6.50 to 7.00
Pipes and flues	6.00 to 6.50
Railroad sheet and tank scrap	5.00 to 5.50
Railroad grate bars	6.25 to 6.75
Machine shop turnings	4.75 to 5.25
Bundled sheet scrap	4.00 to 4.50

Buffalo

BUFFALO, N. Y., July 29, 1913.

Pig Iron.—Sales totaling 25,000 to 30,000 tons, accompanied by reports of increasing activity among the foundries of the Buffalo territory, have held pig iron prices at the level reached a week ago, and have in fact brought about a slight advance in the latter part of the week. Furnace interests say that the bottom was reached when about a week ago \$13.50 was quoted. Some interests are considering nothing less than \$14, and the range has reached the spread of \$13.75 to \$14.50. Melters who withhold placements to cover when the lowest level was reached, and who also asked to have deliveries delayed on iron under contract, are again pressing furnaces for shipments. A considerable portion of the iron booked in the week was for immediate delivery, and the balance over the remainder of the year. Producers are not disposed to consider inquiries for iron wanted later than last quarter, and some have turned down offers for 1914 material. The booking this week was divided about half foundry grades and half malleable. The foundry iron, embracing No. 2 X foundry, No. 2 plain and No. 3, brought \$13.50 to \$14, f.o.b. furnaces. Asking prices are now as follows:

No. 1 foundry	\$14.00 to \$14.50
No. 2 X foundry	14.00 to 14.25
No. 2 plain	14.00
No. 3 foundry	13.75 to 14.00
Gray forge	13.75 to 14.00
Basic	14.00 to 14.50
Malleable	14.00 to 14.50
Charcoal (regular brands)	15.75 to 16.75
Charcoal (special brands)	16.50 to 17.50

Finished Iron and Steel.—Prices remain absolutely firm on all the leading lines, bars, shapes and plates,

as they have done for months, and the producers and their representatives in this territory report an improvement in the tone of the market, gauged by the placement and the inquiries that have materialized. The booking, while not running into large amounts, is said to be more general in character than has been prevailing during the last of the second and so far this quarter. There is still an absence of cancellations and the mills are looking for the development early in the fall of a larger buying movement. There is an absence of new contracts being placed with the fabricators, but they are all engaged up to the limit of their plants in getting out structural orders booked earlier in the year. Some of the mills are said to be in shape now to make slightly better deliveries, but nothing is being promised before last quarter and into the first quarter of next year.

Old Material.—The scrap yards report a better feeling in keeping with that which has been noticeable in the past week among the pig iron producers of the territory. Some sales were made but in limited volume, and not enough to influence any appreciable changes in the prices quoted a week ago. The leader of the week in activity was borings. The present price level has induced dealers to hold off from seeking sales, while the buyers on the other hand have only been placing small business, so as to ward off possible advances in prices. The range for the week, f.o.b. Buffalo, per gross ton, is as follows:

Heavy melting steel	\$11.00 to \$11.50
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel scrap	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	13.00 to 13.50
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Wrought iron and soft steel turnings	6.00 to 6.50
Clean cut borings	6.00 to 6.50
Bundled tin scrap	14.00

German Conditions Not Improved

Further Reductions in Various Products—Still Trying to Combine the Steel Bar Interests

BERLIN, July 18, 1913.

Steadier prices in Belgium and England have given some encouragement to the German markets. Heavy plates, however, have further weakened; few mills are now obtaining more than 118 to 119 marks (\$28.08 to \$28.32), with 1½ per cent. discount, at Essen-Oberhausen.

At the end of last week the Rivet Association voted a reduction of 10 marks (\$2.38) a ton, to 170 marks (\$40.46), in all grades of boiler, bridge, and ship rivets, as well as in ordinary commercial goods. It was decided to continue the association, whose existence was threatened, till October, 1914. Reductions in wire nails ranging up to half a mark (12c.) per metric cwt. are also reported. The new list prices range between 13.50 and 14 marks (\$3.20 and \$3.33) for the home trade, and from 11.50 to 11.75 marks (\$2.72 to \$2.79) for export. The change was made in view of the reduction in the price of wire rods.

Further negotiations in connection with the proposed organization of the bar trade have been in progress this week. It is understood that the question of allotments, the real point of difficulty in the way of effecting a combination, was taken up yesterday for the first time in full meeting, but it has not yet transpired what result, if any, was reached. Meanwhile, the trade appears to have grown more pessimistic about the prospects of the manufacturers getting together. It is reported from the western sections of the country that consumers and dealers have abandoned expectations that the organization will be perfected.

The bar trade is still very quiet, but calls for delivery on order continue of good volume. This is also true of plates.

Heavy June Shipments by the Steel Syndicate

The final returns of the Steel Works Union for June show that its shipments were even greater than given in this correspondence last week. The total was 605,570 metric tons, which was the largest movement for any month of the business year. It should be added,

however, that the result was materially affected by the fact that many of the companies, in finishing up their business year, hurried shipments in order to get them into the year's accounts. How the steel-rail and steel-tie trade has developed may be seen from comparing June's movement with that of July, 1912, the figures being 282,003 and 176,000 tons respectively. For twelve months the shipments of rails (including grooved and light rails and steel cross-ties) amounted to 2,013,000 tons, as against 2,177,000 tons. Shipments of semi-finished steel in June were the lightest of the year, having amounted to only 133,000 tons, as against a maximum of 174,000 tons for last December. For the entire year, too, the movement was lighter than last year by 35,000 tons in a total of 1,825,000 tons. In structural shapes also the movement was slightly less than for 1912; the total was 2,076,000 tons, or 8,000 tons less than for the previous year. The June shipments were the largest since July, 1912. The shipments of the Union in the above products reached a total of 6,514,000 tons, which compares with 6,144,000 tons for the previous year.

The Belgian trade, as mentioned above, has been steadier as to prices for a week. About the end of last week, however, a reduction of 2s. (49c.) in the export price of steel bars was made, making new prices of £4 11s. to £4 12s. (\$22.14 to \$22.38). Iron bars dropped 1s. (24c.) to £4 14s. to £4 16s. (\$22.87 to \$23.35). Bands were reduced 2s. to £6 10s. (\$31.63); thin sheets 1s. to £5 14s. to £5 16s. (\$27.74 to \$28.22); wire, No. 20, 2s. (49c.) to £7 to £7 2s. (\$34.06 to \$34.55). Mail reports from the Belgian trade indicate that the volume of buying this month has continued unsatisfactory.

Some additional details about Thyssen's new establishment at Hagendingen in Lorraine are now available. While the concern has a capital of only 1,000,000 marks, it operates with a borrowed capital of 49,476,000 marks, advanced from Thyssen's great Rhenish establishment, the *Gewerkschaft Deutscher Kaiser*. The new establishment has just issued its first annual report, showing a production of 171,600 tons of pig iron and 142,200 tons of steel ingots. The profits of 1,210,000 marks were wholly written off. The results of the business year did not fulfil expectations, the finishing mills not yet having been completed, and there having also been some difficulty in supplying the furnaces with ores owing to the fact that Thyssen's deposits had not yet been adequately opened up for proper exploitation.

New York

NEW YORK, July 30, 1913.

Pig Iron.—The volume of transactions is about like that of the preceding week and there is the same evidence that a number of melters have bought from furnaces which have supplied them heretofore and have not generally sent out their inquiries. The closing of business in this way is ordinarily taken to mean that tempting prices were made. However, some furnace companies are less anxious to take business at the low prices than they were 10 days ago, and while no higher basis has been established there is a disposition to get a little more money. For example, Buffalo furnaces, which sold rather freely at \$13.50 for No. 2 X foundry, are now asking \$13.75 to \$14 at furnace. It is insisted by some Buffalo sellers that \$13.50 was low point in recent transactions. A number of furnaces in that district have been making sales in the past 10 days at a rate three or four times their current production. There is still considerable inquiry in the market, but it is noteworthy that the recent buying has not been in great part by interests; in fact a number of large buyers have held aloof. The fact seems to be that while occasionally there is a large contract, the aggregate is made up of scattered lots ranging from 100 tons up to 1000 tons—amounts that will carry the buyers only part way through the second half, though in some instances requirements have been covered for three months ahead or for all the remainder of the year. Eastern Pennsylvania and Virginia furnaces have fared alike in being hard pressed by Buffalo competition in the late buying. Virginia producers have gone down to \$13 at furnace for No. 2 X and a shade lower, and at that have found themselves outbid in many cases. At the same time, one eastern Pennsylvania seller announces this week that its figure is now \$16 at furnace for No. 2 X. A purchase of 800 tons of foundry grades by a malleable interest was divided between a Virginia and a Northern furnace. It is believed the requirements

of the malleable syndicate, which it was said some time ago had not been covered, were provided for in the quiet buying of the past 10 days. In this district a 1600-ton inquiry has come up from a Hudson River point, and the New York Central is asking for 1200 tons for second half delivery at its Franklin foundry. A New Jersey shipyard foundry is inquiring for 500 tons. A radiator interest is reported to have bought for an Eastern plant, most of the iron going to Virginia. There has been little buying for radiator works thus far, and the Eastern harvester works have not bought. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$15 to \$15.25. Southern iron is quoted at \$15.50 to \$16 for No. 1 foundry and \$15 to \$15.25 for No. 2.

Structural Material.—Sentiment, it is generally admitted, has improved but there are skeptics who would like to see the betterment in the order books. Favorable signs of quite a tangible nature have appeared, such as an appreciable increase in the number and aggregate of orders for small building operations and additional activity in apartment house projects in the metropolitan district. Conflicting reports are nevertheless heard regarding the attitude of the money market, and financial interests appear still to be conservative. Some fair sized structural steel propositions have been closed but not many new ones have come into the market. Plain material is easily obtained in four to six weeks, and sellers do not expect any marked change to occur in this regard in the immediate future. Of some of the live structural steel projects mention may be made of the placing of the general contract for section 4, route 4, of the New York subway system, involving 4000 tons. Plans are said to be ready for a Federal building at New Haven, involving 1500 to 2000 tons, and there are a number of apartment houses promising early settlement. The Navy Department is to receive at Washington on August 5 bids for delivery in the Brooklyn Navy Yard on 2500 tons of bars and angles, 10,600 tons of plates and 750 tons of channels and beams. The lettings since the last report include 1450 tons to the Levering & Garrigues Company for the General Electric Company at Pittsfield, Mass.; 1100 tons to the Passaic Steel Company for two Paterno apartment houses on Broadway at Seventy-ninth street; 1000 tons to Lewis F. Shoemaker & Co., for a gas producer building for the Pennsylvania Steel Company; 1300 tons to the Riverside Bridge Works, Wheeling, W. Va., for a bottling plant at Havana, Cuba, and 550 tons to the Lackawanna Bridge Company for an office building for the Lehigh Coal Company, Wilkes-Barre, Pa. Plain material continues at 1.45c., Pittsburgh, or 1.61c., New York, with prices from store at 2.10c. to 2.15c.

Plates.—New business is largely made up of small orders, of which exportation constitutes a fair percentage, though shipments to Mexico have to be withheld pending a settlement of political conditions in that country which make it difficult to arrange for railroad transportation. The live business pending in the railroad field comprises 170 passenger equipment cars for the New Haven; 200 and more passenger equipment cars for the New York Central; 28 passenger cars for the Boston & Albany and 1000 gondola and 500 steel hopper cars for the Southern Railroad. It is stated that the Norfolk & Western is to build 700 gondolas having 6 wheel trucks in its own shops. We continue to quote plates at 1.50c., Pittsburgh, or 1.66c., New York, for delivery in 10 days to two weeks, and 1.45c., Pittsburgh, for shipment in 30 days.

Bars.—The bar market is in a strong position if such facts as the following count for anything, namely: Low stocks in the hands of jobbers; little accumulation in the yards of manufacturers, and heavy specifications on existing contracts. In spite of this, new business continues at a rate not more than half that of the shipments and is explained in part by conservatism in many quarters and in part by a feeling of futility in buying far ahead when many shipments are still much belated. The market for steel bars continues at 1.50c., New York, with deliveries in six weeks to three months, and store prices at 2c. to 2.05c. Bar iron business is reported better in the last week than for three or four weeks preceding, but the spurt is not taken yet as having any significance. Bar iron is selling at 1.40c. to 1.50c., New York, with some makers still asking \$1 a ton above the higher quotation. Store prices of iron bars are 2.05c. to 2.10c. Deliveries on railroad track accessories, such as spikes and bolts, are much improved and generally obtainable in two weeks.

July 31, 1913

Ferroalloys.—The situation in 80 per cent. ferro-manganese is practically unchanged, for the reason that consumers are extremely slow in placing orders. They evidently hope to obtain more favorable quotations, and the inquiries referred to a week ago, aggregating about 3000 tons, have been diminished but not killed. The producers' agents adhere to their quotation of \$8.50, Baltimore, for both prompt and future delivery, but prompt material can still be had from merchants at concessions, with \$57.50 about the minimum. The market for 50 per cent. ferrosilicon continues nominal at \$75 for carloads, \$74 for 100 tons and \$73 for 50 tons and over.

Cast-Iron Pipe.—The Degnon Contracting Company has purchased from R. D. Wood & Co. the 10,300 tons of pipe required for the extension of the New York high pressure fire prevention service. The city of Schenectady, N. Y., July 23, placed its contract for about 1500 tons with the same makers. The great Staten Island extension of the Catskill water supply is looming up as a pipe prospect, since the time is rapidly approaching when this work will have to be undertaken. It is understood that two 36-in. mains will be laid under the bay or the Narrows between Brooklyn and Staten Island, requiring a huge tonnage of cast-iron pipe. The general demand is still slow, and municipalities are not coming into the market with any frequency. Prices of carload lots of 6 in. are \$23 to \$24 per net ton, tidewater, New York.

Old Material.—Although transactions in old material have been few, and as far as can be ascertained have involved no quantities of importance, the feeling is somewhat firmer. It is believed that the tendency is toward improvement rather than further depression. Dealers' quotations, which are still largely nominal, are unchanged as follows, per gross ton, New York:

Old girder and T rails for melting	.....	\$8.50 to	\$9.00
Heavy melting steel scrap	.....	8.50 to	9.00
Relaying rails	.....	21.50 to	22.00
Rolling rails	.....	12.00 to	12.50
Iron car axles	.....	20.50 to	21.00
Steel car axles	.....	14.00 to	14.50
No. 1 railroad wrought	.....	11.25 to	11.75
Wrought iron track scrap	.....	10.50 to	11.00
No. 1 yard wrought, long	.....	10.00 to	10.50
No. 1 yard wrought, short	.....	9.50 to	10.00
Light iron	.....	4.00 to	4.50
Cast borings	.....	5.00 to	5.25
Wrought turnings	.....	4.25 to	4.50
Wrought pipe	.....	8.25 to	8.75
Car wheels	.....	12.00 to	12.50
No. 1 heavy cast, broken up	.....	10.25 to	10.75
Stove plate	.....	7.50 to	8.00
Locomotive grate bars	.....	7.00 to	7.50
Malleable cast	.....	8.50 to	9.00

Metal Market

NEW YORK, July 30, 1913.

The Week's Prices

	Copper, New York.				Copper, New York.			
	Cents Per Pound for Early Delivery.		Lead		Spelter		Zinc	
July	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.	
28	14.87½	14.62½	40.80	4.35	4.22½	5.40	5.25	
29	15.12½	14.87½	40.25	4.35	4.25	5.40	5.25	
30	15.12½	14.87½	.....	4.35	4.27½	5.40	5.25	
31	15.25	15.00	40.70	4.35	4.30	5.50	5.35	
1	15.25	15.00	40.85	4.50	4.35	5.60	5.45	
2	15.25	15.00	40.25	4.50	4.35	5.60	5.45	

Copper continued to advance and there has been fair buying of electrolytic. Tin had a fairly active week with small price variations. Lead is up 15 points with the demand steady. Spelter has been bought more freely and quotations have advanced. Antimony continues dull.

New York

Copper.—American consumers have been better buyers of copper in the past few days, according to producing interests, but there is a tendency in the trade to question statements that extremely large sales have been made. It cannot be doubted, however, that since the heavy European buying movement of a few days ago domestic consumers, seeing prices advance, have entered the market, but they have done so quietly and the activity has had the appearance of being more or less forced. The metal has advanced two or three times in the last week. Its strength is attributed more to the strike of miners in the Lake region than to anything else, although the production of the Nichols refinery has been curtailed by furnace troubles. In Lake there has been no buying and prices are entirely nominal. Two or three important refineries are out of the market entirely. If success was had in finding Lake it would command a stiff price. Electrolytic is quoted to-day at

15c., cash, New York, and Lake at 15.25c., cash, New York. London quotations to-day were £66 for both spot and future. The exports this month total 25,621 tons.

Pig Tin.—Since the last report there has been a better demand from consumers for small lots with quick delivery specified. This activity slackened up yesterday. On Monday there was a fairly active business, most of it between dealers and speculators who wanted spot tin to make good their July contracts. These purchasers, while they were buying spot, sold early August and other August positions. The sale of about 2500 tons of Banca tin in Amsterdam to-day brought 111½ florins, equivalent to about 40.60c. c.i.f., New York, the lowest price brought at one of these sales this year. On the strength of the news the London market broke £2 15s. and caused corresponding weakness here. The quotation in London to-day is £182 15s. for both spot and futures, and the New York price is 40.25c. Arrivals this month total 4420 tons and there is afloat 1602 tons.

Lead.—Under a fairly steady demand, mostly for small lots, but aggregating good volume, lead was advanced yesterday 15 points, making the New York price 4.50c. The St. Louis price had been advancing steadily throughout the week and to-day is 4.35c. The advances may be ascribed, at least in part, to bullish talk on the part of dealers. Some of them are not so optimistic, however, and do not believe that the advance will be long held in view of the fact that consumption is not as heavy as it was a short time ago.

Spelter.—The market has advanced 20 points in the last week, 10 on Monday and 10 on Tuesday, bringing prices up to 5.45c., East St. Louis, and 5.60c., New York, on which basis 200,000 lb. for delivery in the last half of August was sold yesterday. Buying is described as fair but not altogether general.

Antimony.—The weakness and inactivity which have characterized antimony for some months continue. The condition of the market is attributed to the fact that bonded warehouses now hold, according to government figures, about 4,500,000 lb. which was imported in anticipation of lower tariff duties. The exporters expected to have the metal released before this time and, of course, are disappointed. So far the stored antimony has served mainly to deaden the market.

Old Metals.—Although the market shows no activity, prices are higher. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	14.25 to 14.50
Copper, heavy and wire	14.00 to 14.25
Copper, light and bottoms	13.00 to 13.25
Brass, heavy	9.50 to 9.75
Brass, light	8.00 to 8.25
Heavy machine composition	13.25 to 13.50
Clean brass turnings	8.75 to 9.00
Composition turnings	11.75 to 12.00
Lead, heavy	4.35
Lead, tea	4.10
Zinc, scrap	4.00

Chicago

JULY 28.—The copper market has sharply felt the influence of the Michigan miners' strike, and prices show an advance of half a point. Other metals likewise show a corresponding advance. We quote as follows: Casting copper, 15.25c.; Lake, 15.50c., in carloads for prompt shipment; small lots, ¼c. higher; pig tin, carloads, 41.25c.; small lots, 43.50c.; lead, desilverized, 4.30c. to 4.35c.; corroding, 4.65c. to 4.70c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.30c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is \$7.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 12.50c.; copper bottoms, 11.25c.; copper clips, 12.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 26c.; tinfoil, 32c.; block tin pipe, 36c.

St. Louis

JULY 28.—Prices have moved up slightly with quite satisfactory sales. Lead is quotable at 4.25c., with sales at that figure and the same price offered for more. Spelter is steady at 5.32½c. to 5.35c. with a good demand. Lake and electrolytic copper are higher, at 15.60c. for the former and 15.47½c. for the latter. Tin is firm at 40.95c. to 41.20c. Cookson's antimony is dull and a little off at 8.75c. to 8.90c. In the Joplin ore market the highest price reported for zinc sulphides was \$47 per ton on a settlement, the basis price ranging from \$41 to \$44 for 60 per cent., which was \$1 to \$2

lower than the preceding week. The sheet ground mines have shut down for the most part and will not resume until prices are better. Calamine brought \$20 to \$21, with the top as high as \$26 for grades running in excess of 40 per cent. Lead ore is unchanged at \$52.50 for 80 per cent. We quote miscellaneous scrap metals as follows: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10.50c.; zinc, 2.50c.; lead, 3c.; pewter, 21c.; tinfoil, 27c.; tea lead, 2.75c.

Iron and Industrial Stocks

NEW YORK, July 30, 1913.

The improvement manifested over a week ago has made further progress, and all prices of stocks are now considerably above the level of the early part of July. The better tone of the stock market is the subject of wide comment, as rising prices in stocks are highly influential in bringing about a more hopeful feeling in general trade circles. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can., com.....	31¼-34½	Railway Spring, com.	25¼-27
Am. Can., pref.....	92¼-93¾	Railway Spring, pref.....	91
Am. Car & Fdy., com.	43¼-45¼	Republic, com.....	24-25½
Am. Loco., com.....	30-32½	Republic, pref.....	85-87
Am. Loco., pref.....	100¾	Rumely Co., com.....	16¾
Am. Steel Foundries.....	27	Rumely Co., pref.....	39¾-42½
Bald. Loco., com.....	42-43	Sloss, com.....	26½-28
Bald. Loco., pref.....	103-103½	Pipe, com.....	11½-13
Beth. Steel, com.....	32¼-34¾	Pipe, pref.....	48¾-49
Beth. Steel, pref.....	70-73½	U. S. Steel, com.....	56¾-59¾
Case (J. I.), pref.....	98-98½	U. S. Steel, pref.....	106¼-108¼
Colorado Fuel.....	29½-32½	Va. I. C. & Coke.....	41¼
Deere & Co., pref.....	94½	Westinghouse Elec.	61½-64
General Electric.....	139¾-140½	Am. Ship, com.....	45
Gr. N. Ore Cert.....	33½-37¾	Am. Ship, pref.....	98
Int. Harv., com.....	106¼-110	Chic. Pneu. Tool.....	51¼-53
Int. Harv., Corp.....	106-108¾	Cambria Steel.....	46½-48
Int. Harv. Corp., pref.....	113½	Lake Sup. Corp.....	24-25
Int. Pump, com.....	6½	Pa. Steel, pref.....	64¾
Int. Pump, pref.....	23¾-29	Warwick.....	10½
Nat. En. & St., com.	13-13¾	Crucible Steel, com.	13¾-14¼
Nat. En. & St., pref.....	78	Crucible Steel, pref.	87½-90
Pressed Steel, com.	24¾-25	La Belle Iron, com.	46¼-47
Pressed Steel, pref.....	96		

Dividends Declared

The Lackawanna Steel Company, regular quarterly, 1¾ per cent. on the preferred stock, payable September 1.

The American Steam Gauge & Valve Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 1.

The J. G. Brill Company, regular quarterly, 1¾ per cent. on the preferred stock, payable August 1.

The Stewart-Warner Speedometer Corporation, regular quarterly, 1¼ per cent. on the preferred, and 1½ per cent. on the common stock, both payable August 1.

The International Harvester Company of New Jersey, regular quarterly, 1¾ per cent. on the preferred stock, payable September 2.

The International Harvester Corporation, regular quarterly, 1¾ per cent. on the preferred stock, payable September 2.

The United States Steel Corporation, regular quarterly, 1¾ per cent. on the preferred stock, payable August 30, and 1¼ per cent. on the common stock, payable September 29.

American Mine Safety Association

The annual meeting of the American Mine Safety Association, composed of leading coal and metal mine operators, mining engineers, mine-safety engineers, and mine surgeons, will be held in Pittsburgh, Pa., September 22-24. This association, which held its first meeting a year ago, has for its purpose a reduction of the number of accidents in the mines and quarries (3602 in the year 1911) and the alleviation of the more than 60,000 men who are injured each year.

The programme will include a mine-rescue and first-aid contest at Arsenal Park September 22; in the evening a reception to the members and motion-picture lecture on the mining industry. On the second day the opening session will be held in the morning and a report of the executive committee will be made on the proposed constitution of the society. In the afternoon there will be an explosion in the experimental mine of the Bureau of Mines at Bruce-ton, Pa., to which all the members will be invited. On the third day there will be a business session and a selection of officers. In the afternoon members will visit the experimental station of the Bureau of Mines at Fortieth and Butler streets, Pittsburgh.

Fuel Oil Information

Tate-Jones & Co., Inc., Pittsburgh, Pa., have just issued Circular No. 142, supplementary to Nos. 140 and 141, which appliances for handling and burning fuel oil as well as its advantages were described. This circular gives complete data regarding various types of installations of the company's burners, together with fine illustrations. It is chiefly devoted, however, to information and figures on the burning of fuel oil compiled from actual results obtained from 15 years of experience in such work.

An advantage, to which attention is called, is that with oil as a fuel the boiler can be pushed much beyond its rating and an evaporation obtained impossible with coal. To substantiate this statement tables of tests made by the U. S. Navy department as well as others showing comparative results from coal and oil are given and they are interesting. Actual results in certain types of furnaces are given, such as air, annealing, bolt heading, brass melting, billet heating, open hearth, etc., showing the amount of coal equivalent to one gallon of oil. An instructive discussion of the conditions of combustion and the importance of complete combustion is an important part of the circular. Valuable tables relating to oil are also included and discussed. The circular concludes with a list of 100 types of furnaces and industries which the company has had experience in operating with oil burners, showing the great diversity in their use.

The N. & G. Taylor Company states that a fire, starting at eight o'clock on the evening of July 22 in a frame structure, housing the bar-mill shear, destroyed several frame buildings at the southwest corner of the company plant at Cumberland, Md., including a foundry building and the bar-mill boilers. The loss is small and fully covered by insurance. Some inconvenience was suffered from a temporary shut-down of several days in the bar mill. The buildings directly adjoining the frame structure destroyed by the fire escaped damage from the falling sparks and embers, through the protection afforded by their tin roofs.

Statistics of the Cycle and Automobile Manufacturers Association of France show that at the close of 1912 there were 89,185 motor cars, 28,641 motor cycles and 2,989,985 bicycles in use in France, or one automobile for every 500 inhabitants, one bicycle for every 13, and one motor cycle for every 1382 persons, as compared with one automobile and one motor cycle for every 2000 inhabitants and one bicycle for every 30 persons 10 years ago. It is estimated that from 1800 to 2000 foreign-made cars are sold in France every year.

The Department of Commerce, through the Bureau of Navigation, has issued 3407 licenses to wireless operators and stations in the United States during the first four months of the operation of the act to regulate such communications, which went into effect December 13, 1912. Of these, 1279 licenses are to first grade commercial operators, 186 to second grade and 1185 to amateurs. Besides these, 46 American ship stations and 18 coast stations have been granted licenses.

The Hawley Down Draft Furnace Company, Easton, Pa., is notifying the trade that under its new organization and management it finds the demand for its Hawley-Schwartz metal-melting furnaces is steadily increasing. The company also makes the Hawley down draft smokeless furnaces, which save fuel.

The new plant of the Gadsden Pipe & Foundry Company, Gadsden, Ala., of which Otto Agricola is president, will manufacture only medium-sized soil pipe and will cater especially to the export trade which uses that size. Canada and Porto Rico are reported as the principal points of prospective shipment.

Ernesto Stassano has recently taken out a United States patent covering an improvement in his electric furnace. It has for its object an improved means for suspending the furnace chamber, whereby a simple oscillatory movement gives rise to a more complete stirring and agitation of the molten metal.

Personal

M. R. D. Owings, who for the last eight years has been in charge of the publicity department and service bureau of the International Harvester Company, has been elected vice-president and a director of the M. Rumely Company, La Porte, Ind., with special supervision over the credit and collection departments. His experience in the agricultural implement business has been long and varied, beginning with the Sandwich Mfg. Company and followed by a connection with the Milwaukee Harvester Company, during which he was auditor, assistant to the general manager, head of the purchasing department, sales manager and secretary of the company. In the formation of the International Harvester Company Mr. Owings took an important part in the organization of the international branch houses, the establishment of the credit bureau and the development of the office systems.

W. J. Bray, president of the Republic Iron & Steel Company, Youngstown, Ohio, returned to America on Saturday from a tour of Europe which included participation in the Deutschlandreise of the American Society of Mechanical Engineers.

William T. Dunning, secretary of the Chester Steel Castings Company, Chester, Pa., has also assumed the duties of general manager, succeeding Frank Francis, who resigned owing to ill health. Mr. Dunning began his service with the company as a clerk in its Philadelphia office in 1898, was made purchasing agent in 1905 and has been secretary since 1906.

W. S. Elphinstone, chief mining engineer of Tata Iron & Steel Company, of India, is in the United States for a day or several weeks.

Henry L. Wratten, for seven years general superintendent of the large boiler works of S. Freeman & Sons, Racine, Wis., and associated with the firm for more than 20 years, has resigned, effective August 1, to take a well-earned rest. He began his career as a workman in the boiler shop, then of small dimensions, and has been a prominent factor in the upbuilding of the business.

Philetus W. Gates, president Hanna Engineering Works, Chicago, arrived in New York on July 26, on the steamship Kaiserin Auguste Victoria, after a sojourn in Germany, where he had participated in the tour of industrial Germany undertaken by members of the American Society of Mechanical Engineers. Among others who returned on the same ship from the Deutschlandreise were: Herbert W. Alden, chief engineer Timken-Detroit Axle Company, Detroit; Frank T. Chapman, Eastern manager, Vento Department, American Radiator Company, New York; William C. Dart, president Rhode Island Tool Company, Providence, R. I.; Morris Knowles, consulting engineer, Pittsburgh; Norman Marshall, consulting engineer, West Newton, Mass.; George E. Merryweather, president Motch & Merryweather Machinery Company, Cleveland; Frank F. Nickel, engineer, Henry R. Worthington, Harrison, N. J.; Ernest W. Pelton, superintendent of power, the Stanley Works, New Britain, Conn.; Knight C. Richmond, consulting engineer, Providence, R. I.; C. R. Sadler, Babcock & Wilcox Company, Bayonne, N. J.; L. B. Webster, efficiency engineer, American Gas & Electric Company, New York City, and Elliott H. Whitlock, factory manager, National Carbon Company, Cleveland.

Charles H. Holbrook, formerly of 90 West street, New York, who has for some time represented the Huntington Machine & Foundry Company, Huntington, Ind., as general sales agent, has associated himself with the H. V. Lewis Company as a stockholder and will henceforth take an active interest in the business of that company. The H. V. Lewis Company has taken over the account of the Huntington Machine & Foundry Company as direct sales agent in the East, with an office at 30 Church street, New York.

Maurice C. Lloyd, representing the machinery supply house of Eliza Tinsley, Melbourne, Australia, has been in this country several weeks visiting the trade with which his house has connections.

E. F. Lake has moved his metallurgical engineering business from Bayonne, N. J., to Detroit, Mich., where he is located at 1453 Waterloo street.

John Goetz, for several years in charge of tool room and light manufacturing operations in the shops of the Kempsmith Mfg. Company, Milwaukee, Wis., has been appointed superintendent.

James Albert Green, president Matthew Addy & Co., Cincinnati, Ohio, is enjoying a vacation in Canada.

E. Schaltenbrand has resigned his connection with the German Steel Works Union to become general manager of the Bohenhohe Spelter Works.

Obituary

ROBERT ESCOBAR died in June in Havana, Cuba. He was born in that city about 1837 and was graduated with high honors as a civil engineer in 1857 from the Rensselaer Polytechnic Institute, Troy, N. Y. He was the designer of many bridges, including that at Poughkeepsie, N. Y., the Sixth Street Bridge in Pittsburgh, and the Merchants' Bridge at St. Louis. Many years ago he made the first design for a bridge over Blackwell's Island, New York, for which he was awarded first prize. He also designed two types of bridges over the Hudson River at Fifty-ninth street, New York, one of the suspension and the other of the cantilever type, but the project never developed for want of proper financial backing. He was associated at one time with C. C. Schneider, past president of the American Society of Civil Engineers, and for many years was the chief engineer of the Union Bridge Company, Athens, Pa., in which Charles Macdonald was the senior partner.

L. C. NOBLE, vice-president Pittsburgh Spring & Steel Company, Pittsburgh, Pa., in charge of the Chicago office since 1902, died at his home in Evanston, Ill., July 19, after a brief illness. Prior to his connection with the company named he had been Western sales manager for the A. French Spring Company.

Sons of Vulcan Scale Gets Some Signatures.—Last week Brown & Co., Inc. (operating the Wayne Iron & Steel Works), Zug Iron & Steel Company and Pittsburgh Forge & Iron Company, all of Pittsburgh, signed the Sons of Vulcan scale, which calls for a flat rate of \$7 a ton for boiling from July 1. The scale was signed with the provision that should any concessions be made to the other bar-iron mills, the signers will receive the benefit of them. Others that have not yet signed are the Kittanning Iron & Steel Company, Lockhart Iron & Steel Company, A. M. Byers Company, and Youngstown Sheet & Tube Company. The Sons of Vulcan is an organization of puddlers only, and the seven concerns noted have heretofore signed its scale.

The net surplus of idle cars on July 15 on the lines of the United States and Canada was 69,405, as compared with 63,704 on June 30, an increase of 5701 cars. In the two weeks ended July 15 the net surplus of box cars decreased from 32,323 to 31,950, but the coal car surplus increased from 8234 to 11,397. There was a small change in flat cars. The surplus of box cars last year in July was about the same as this year's. In late July, according to experience in other years, the surplus should be steadily diminished.

A window in Westminster Abbey, London, to the memory of Lord Kelvin, was dedicated July 15. A special service was held and there was a large congregation of engineers and scientists. The American Society of Mechanical Engineers had a large representation, headed by Philetus W. Gates, Chicago; F. W. Dean, Boston, and Secretary Calvin W. Rice. The window, which is in the east bay of the nave on the north side, was subscribed for by engineers in Great Britain, the United States and Canada.

The Bronze Metal Company, Meadville, Pa., which at present is operating in shops formerly owned by the Erie Railroad, is erecting a large new plant, which it expects to occupy in a short time.

Pittsburgh and Vicinity Business Notes

The American Steel Foundries is building at its works at Sharon, Pa., a new 25-ton open-hearth furnace designed to use powdered coal for fuel. The National Malleable Castings Company and the Sharon Steel Hoop Company, Sharon, Pa., have been using powdered coal for fuel in open-hearth practice for some time with satisfactory results.

The United Engineering & Foundry Company, Pittsburgh, has received an order from the Pennsylvania Steel Company, Steelton, Pa., for a 2000-ton high speed forging press, and an order from the Brooklyn Navy Yard for two Pittsburgh board drop hammers, one of 2000 lb. and the other of 1000 lb. capacity, together with trimming presses for them.

The Matthews Gravity Carrier Company, Ellwood City, Pa., is developing a new automatic conveyor for handling pig iron in foundry yards, and has already installed one which is said to be giving satisfactory results.

The J. H. Hillman & Sons Company, Oliver Building, Pittsburgh, has bought a controlling interest in the Bessemer Coke Company, which has 1041 ovens in the Connellsville and Klondike regions, with a capacity for making 600,000 tons of coke per year, mining in addition about 200,000 tons of coking coal. W. Y. Humphries has resigned as president of the Bessemer Coke Company and has been succeeded by J. H. Hillman, Jr. Herman Griffin has also resigned as treasurer, being succeeded by A. B. Sheets; William Harris has resigned as secretary, succeeded by K. T. Phelps. E. H. Jennings, a well-known capitalist of Pittsburgh, continues as a director in the company. The J. H. Hillman & Sons Company will now have a capacity for making and shipping 3,600,000 tons of coke per year. The change in ownership and among officials was effective July 28.

The National Tube Company, Frick Building, Pittsburgh, announces that, commencing August 1, it will enter the electrical conduit field and has contracted with the National Metal Molding Company and the Safety Armored Conduit Company, both of Pittsburgh, to manufacture and sell this product as its agents under their various brands. The National Tube Company has decided to sell this product on the "Pittsburgh basing discount" plan in the same manner as it has sold wrought pipe for other purposes for the past 13 years. It will supply the material in all sizes from 1/2 in. to 2 in., and larger if needed.

The Carnegie Steel Company of Pittsburgh is now operating 47 out of 59 blast furnaces. The idle stacks are two Edgar Thomson, one Lucy, one South Sharon, one Clairton, one Carrie, one Ohio, one Mingo, Steubenville, Zanesville, Neville and Edith. All these furnaces except the last four are being refined and repaired, and the Carrie and Ohio stacks will blow in within a few days. The Steubenville, Zanesville, Neville and Edith furnaces have not been operated for some years.

The report that the Wheeling Sheet & Tin Plate Company, which is building a 10-mill tin plate plant at Yorkville, Ohio, would be included in the Wheeling consolidation is officially denied. No other concerns are in the deal than the five noted in *The Iron Age* last week.

As has been the custom in recent years, a number of college professors are working in the shops of the Westinghouse Electric & Mfg. Company at East Pittsburgh, Pa., this summer. The 28 men who are spending their vacations in this way represent the electrical engineering departments of 26 colleges, are employed on the regular shop payroll and conform to shop hours and regulations. After the day's work is finished these student workmen proceed on a trip of inspection through the works with shop foremen and superintendents for their guides, after which there is a meeting for a discussion of the points covered on the trip. At these meetings lectures are given by engineers, works managers, foremen and also by some of the educators themselves.

The Standard Fitting & Mfg. Company, West Newton, near Pittsburgh, has commenced operations in its new factory. It will manufacture a complete line of wrought pipe nipples, cast-iron plugs and iron pipe railings. Electric current will be used exclusively for power and light.

A. F. Plock, engineer, Park Building, Pittsburgh, has received contracts for installing the Hinkel safety device

on the blast furnace elevators of the Ohio Iron & Steel Company, Lowellville, Ohio; Wellston Iron & Steel Company, Wellston, Ohio, and Northern Iron Company, Standish, N. Y.

The strike at the Pope works of the Phillips Sheet & Tin Plate Company at Steubenville, Ohio, has extended to the tin-plate plant operated by this company at Clarksburg, W. Va., where about 300 men went out on a sympathy strike, and President D. M. Weir at once closed the entire works. Black plate is being shipped from Clarksburg to the company's plant at Weirton, W. Va., which is in full operation. The Phillips company states that last week it was operating 9 of the 12 mills in the Pope works and expects shortly to have the other 3 mills running. The Clarksburg plant may remain idle until the trouble at Steubenville is settled.

The Pressed Metal Radiator Company, Pittsburgh, has filed a notice at Harrisburg, Pa., of an increase in indebtedness of \$150,000.

Hereafter the works of the American Sheet & Tin Plate Company at Farrell, Pa., formerly known as the Sharon works, will be called the Farrell works in honor of James A. Farrell, president, United States Steel Corporation.

After four years of practically continuous operation the hot mills in the plant of the West Penn Steel Company, Brackenridge, Pa., will close down August 2 for necessary repairs and to give the workmen a vacation and will be started up again on Monday, August 18.

The machine shop and two small foundries of the Standard Railways Equipment Company at Parnassus, Pa., near Pittsburgh, were damaged by fire last week to the extent of nearly \$100,000. The damaged portion of the works will be rebuilt as soon as possible.

The Ajax Company, Corry, Pa., is having plans prepared for a new foundry, of concrete and steel construction, which it expects to erect this fall at an estimated cost of \$25,000. The building will be equipped with cranes, cupolas and the latest facilities for handling foundry work.

The Epping-Carpenter Pump Company, Pittsburgh, will double the capacity of its foundry, plans for the extension having been made by S. Diescher & Sons, Farmers' Bank Building, Pittsburgh.

The Baltimore & Ohio Railroad has filed supplemental tariffs with the Interstate Commerce Commission reducing the freight rate on coke from the Connellsville region to points in the Wheeling district from \$1.30 to \$1.20 per ton. The proposed reduction is voluntary, and if approved by the commission will become effective August 25.

Germany Will Need American Ore Unloaders

In a long article in *Stahl und Eisen*, July 3, 1913, entitled "The Hulett Unloader and Its Adaptability in Germany," Richard Borschers, government architect and engineer, Coblenz, gives a fully illustrated description and discusses the machine fully. His conclusions are as follows:

"If I may consider the results of my former studies and investigations, I conclude that while the difficulties which essentially exist in our present ore-handling arrangements are sufficiently great for the introduction of apparatus of the Hulett type in Germany, really the time for the erection of such apparatus has not yet arrived. Nevertheless it will come, and in this opinion I am joined by many professional men in the trade. The growing demands on our facilities for handling the ore will force the adoption of a uniform method for the whole business of its transportation and unloading. This is the road the Americans have traveled and the one we also must take. The special object of my article is to draw attention to the subject so that in new harbor arrangements, and especially in building new ore boats and steamers, calculations can be made for the coming necessity for new unloading apparatus. The additional expense which will now be attached to such foresight will surely be small compared with future advantages."

The Youngstown Bronze & Iron Company, Youngstown, Ohio, has changed its name to the Mahoning Foundry Company.

The Cleveland Pig-Iron Proposals

Protest from the Merchant Interest—Makers
Divided, but Selling Company Is Formed

(Special Correspondence)

LONDON, England, July 18, 1913.—The greatest consternation still prevails among the iron merchants of this country anent the proposals of the Cleveland blast-furnacemen, having for their object the abolition of the warrant iron market, and the apprehension has spread to the consuming trades, for a strongly representative meeting has been held in Glasgow of the Scotch founders, a very powerful body, to protest against the suggested concentration in the hands of one organization of the sole selling of the pig-iron output of the Cleveland district. A great part of the output of Cleveland goes to Scotland, where it is used in the Falkirk area by the makers of stove, range and other castings. In recent years Scotland has taken annually from 316,000 to 375,000 tons of Cleveland iron, and for the first half of this year absorbed 182,000 tons. At the Glasgow meeting nothing was done except to pass a resolution to the effect that if the proposals come into force the users of Cleveland iron in Scotland would take every possible step in their own defense, "as, for instance, buying their iron in other markets." This shows the temper of the trade in connection with the proposals.

At the last meeting of the Cleveland iron masters a letter was read from the iron merchants of the district. After formally protesting against the proposed action it says:

"That a continuance of the warrant store may not be a necessity is, of course, a point on which opinions will differ. It is two-sided, sometimes advantageous to the makers, at other times not so advantageous. Our opinion is that the pig-iron business could be conducted equally well without the store. So long as two or three firms with branches in Glasgow were able to manipulate their business in connection with the warrant market, while makers supplied the counters by filling the stores and selling warrants in preference to dealing with local traders, it is not to be wondered at that they could in many instances undersell the local firms.

"This question, however, can be left to the judgment of makers, but what concerns the merchants most is that they understand a proposal is under consideration to sell all the iron produced in this district through one company. In the interests of all parties concerned, the merchants contend that this would be an unfortunate step, and one that cannot but be prejudicial. They therefore desire to bring before the makers' notice, categorically, their reasons for holding this view.

"1. It was entirely through the strenuous exertions and large capital of the merchants, and at much expense, that Cleveland pig iron became known all over the world, and by their continued energy the demand is maintained, and it is through their efforts, coupled with suitable financial and transit arrangements, that orders are secured which would otherwise go elsewhere.

"2. Merchants pay weekly for all shipments and deliveries, and have encouraged business in every possible way by granting long credit to buyers, undertaking risk of delivery at works, both at home and abroad, far removed from the port of destination.

"3. Shipments of pig iron abroad are frequently made in conjunction with other merchandise by merchants who thereby secure advantages in the rates of freight, thus enabling Middlesbrough pig iron to compete successfully with other makes.

"4. The present organization of the merchants' business is undoubtedly calculated to benefit the makers, and as hitherto there has been no difficulty in disposing of the available supply of Cleveland iron, and seeing the supply for the market diminishes every year, there is no reason to suppose that any difficulty will be experienced in the future.

"5. If the sale of pig iron were put in the hands of one company, the monopoly thus created could not be a disadvantage to makers, as they would require to pay that company something for which under the present conditions they pay nothing. Moreover, the incentive to individual effort would be destroyed, the advantages of an open market lost, and a gradual curtailment of orders would result,

as probably iron from other districts would be introduced.

"6. To interfere with the business of the merchants, carefully built up and nurtured over a long series of years, and which has made the Cleveland iron trade so successful, would, in our opinion, be manifestly unfair and unjust, causing serious loss to many without conferring any benefit on the makers.

"7. It seems to us that there is a feeling among the Cleveland iron masters that they will be adversely placed through a regrettable failure. There is no cause for this. The firm alluded to had no monopoly. We other merchants did business in the same channels, and will now receive a fuller share of such business, which we are already doing.

"8. In our opinion, it is of the utmost importance that producers and merchants should work amicably together, and interfere as little as possible with their usual connections. We cannot help thinking that such an injustice, as we presently understand it, is altogether foreign to you, as the relations between ironmasters and merchants have always been so pleasant, and a continuance of such relations is we consider in the interests of both parties."

The foregoing states very clearly the position of the merchant trade in Cleveland pig iron. It appears that there is not complete harmony among the makers, however, and it is understood that more than one important furnace owner is strongly opposed to any alteration in the methods of marketing output. The opinion of the leading merchant interests in London is that even if put into operation the plan could have only a short life, and that it would break down, if for no other reason, because of finance. Mean-time speculation in the warrant iron market has been practically suspended, and brokers are in many cases refusing to execute commissions on the short side of the market.

The latest news is that the iron masters' committee has decided to form a company with these three objects: to distribute the output, to fix selling prices and to control the production. This naturally involves the abolition of the warrant store so far as Cleveland iron is concerned.

Heine Safety Boiler Company's Superheaters.—

The superheaters built by the Heine Safety Boiler Company, St. Louis, Mo., have a box or header similar to that of the company's boilers. The staybolts employed are of the hollow type, which permits the nozzles of a soot blower to be introduced to keep the surface of the superheater tubes clean. The steam nozzles inserted through the staybolts are arranged so that a group at the top discharges within a few feet of the outer end, while the remainder protrude into the staybolts. In cleaning a boiler in this way, the superheater blower is first operated, the soot being carried by the draft into the boiler setting, from which it passes to the uptake. Any soot that may be redeposited in the boiler can be dislodged when the boiler is blown. It is recommended that this blowing be done several times a day; if this course is pursued, the time required for each operation is very short.

Activity in the Swedish iron industry in the past few years has been great. The capacity of the blast furnaces has nearly doubled since 1883, the production per furnace last year being 5565 metric tons. The production of electric furnace pig iron increased from 122 tons in 1908 to 5786 tons in 1911 and 17,566 tons in 1912.

The National Quality Lamp Division of the General Electric Company has placed orders for four 250 hp. Sterling boilers and for Detroit Stoker Company's stokers for a heating plant that it is erecting in connection with its 152d street works in Cleveland, Ohio.

A large Eastern railroad, using over 1,000,000 ties per year, in its last annual report showed that the cost had risen from 44c. in 1903 to 70c. in 1912, or an increase of 59 per cent. in 10 years. For the 1912 requirements in ties this increase represents \$500,000.

It has been decided by the German Ironmasters' Association to take no part in the Panama-Pacific Exhibition because in its opinion exhibitions are increasing in a manner injurious to general trade interests.

Data on Feeds for Gear Cutters

Charts Compiled by a Manufacturer
Showing the Permissible Rates

The Cincinnati Gear Cutting Machine Company, Elam street and Garrard avenue, Cincinnati, Ohio, has recently

Fig. 1 giving the data for high speed steel cutters, while corresponding information for carbon steel gear cutters is given in Fig. 2.

The company points out that there are several things which enter into the element of time in the cutting of gears. These include the materials of which the cutter and the gears to be cut are made, the shape of the gear,

Using High Speed Steel Cutters with periphery speed on cast iron of 55 ft. per minute and 80 ft. per minute on steel.

Using lard oil lubricant on steel gears.

Gears to be substantial in design.

Belts on the machine to be in good condition.

Feeds apportioned to different sizes of machines are those between the vertical lines shown by arrows.

One cut for finishing gear.

Roughing cut, leaving .010 to .030 for finishing gears.

Shearing tooth cutter for roughing cut.

Finishing cut.

Diametral Pitch	1	1½	1½	1½	2	2½	3	4	5	6	7	8	9	10
Cast Iron Gears.....				2½	3½	3½	3½	3½	4½	4½	4½	5½	5½	
Soft Steel Gears.....				2½	2½	2½	2½	2½	3½	3½	3½	4½	4½	
High Carbon Steel Gr.				2½	2½	2½	2½	2½	3½	3½	3½	4½	4½	
Nickel Steel Alloy Gr.				1½	1½	1½	2	2	2	2½	2½	2½	3½	3½
Cast Iron Gears.....	2	2½	3½	4½	5½	5½	5½	5½	5½	5½	5½	6½	6½	
Soft Steel Gears.....	1½	2	2½	3½	4	4	4½	4½	4½	4½	4½	5½	5½	
High Carbon Steel Gr.	1½	2	2½	3½	4	4	4½	4½	4½	4½	4½	5½	5½	
Nickel Steel Alloy Gr.	1½	1½	2½	2½	3½	3½	3½	3½	3½	3½	3½	4½	4½	
Cast Iron Gears.....	2½	3½	4½	5½	6½	6½	8½	8½	8½	8½	8½	10½	10½	10½
Soft Steel Gears.....	2	2½	4½	5½	6½	6½	8½	8½	8½	8½	8½	10½	10½	10½
High Carbon Steel Gr.	2	2½	3½	4½	5½	5½	6½	6½	6½	6½	6½	8½	8½	8½
Nickel Steel Alloy Gr.	1½	2	3½	4½	4½	4½	5½	5½	5½	5½	5½	8½	8½	8½
Cast Iron Gears.....	2½	3½	4½	5½	6½	6½	6½	6½	6½	6½	6½	6½	8½	8½
Soft Steel Gears.....	2½	3½	4½	5½	6½	6½	6½	6½	6½	6½	6½	6½	8½	8½
High Carbon Steel Gr.	2½	3½	4½	5½	6½	6½	6½	6½	6½	6½	6½	6½	8½	8½
Nickel Steel Alloy Gr.	2½	2½	3½	4½	5½	5½	5½	6½	6½	6½	6½	6½	8½	8½

3 G C

4 G C

5 G C

6 G C

7 G C

Fig. 1—Chart Showing the Proper Feeds to Be Used with High Speed Steel Cutters

prepared a number of charts for use of its agents, giving data on the feeds to be used in connection with the cutting of gears. Two of these charts are reproduced herewith,

the accuracy of finish required, the shape of the cutter, the kind of lubricant and the gib adjustment of the machine. The cutter can be made from either carbon or high speed

Using Carbon Steel Cutters with periphery speed on cast iron of 35 ft. per minute and 30 ft. per minute on steel.

Using lard oil lubricant on steel gears.

Gears to be substantial in design.

Belts on the machine to be in good condition.

Feeds apportioned to different sizes of machines are those between the vertical lines shown by arrows.

One cut for finishing gear.

Roughing cut, leaving .010 to .030 for finishing gears.

Shearing tooth cutter for roughing cut.

Finishing cut.

Diametral Pitch	1	1½	1½	1½	2	2½	3	4	5	6	7	8	9	10
Cast Iron Gears.....				2½	2½	2½	3½	3½	3½	3½	3½	3½	4½	4½
Soft Steel Gears.....				1½	2	2	2½	2½	2½	2½	2½	2½	3½	3½
High Carbon Steel Gr.				1½	1½	1½	1½	2	2	2	2	2	2½	2½
Nickel Steel Alloy Gr.				1	1½	1½	1½	1½	1½	1½	1½	1½	2	2
Cast Iron Gears.....	1½	1½	2½	3½	4½	4½	4½	4½	4½	4½	4½	5½	5½	5½
Soft Steel Gears.....	1½	1½	1½	2½	3½	3½	3½	3½	3½	3½	3½	4½	4½	4½
High Carbon Steel Gr.	1	1	1½	2½	2½	2½	2½	2½	2½	2½	2½	3½	3½	3½
Nickel Steel Alloy Gr.	1	1	1	1½	2	2	2	2	2	2	2	2½	2½	2½
Cast Iron Gears.....	2½	2½	2½	4½	5½	5½	5½	5½	5½	5½	5½	6½	6½	6½
Soft Steel Gears.....	1½	1½	2½	4½	4½	4½	4½	4½	4½	4½	4½	5½	5½	5½
High Carbon Steel Gr.	1½	1½	1½	3½	3½	3½	3½	3½	3½	3½	3½	4½	4½	4½
Nickel Steel Alloy Gr.	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½	3½	3½	3½
Cast Iron Gears.....	2½	2½	2½	4½	4½	4½	4½	4½	4½	4½	4½	5½	5½	5½
Soft Steel Gears.....	1½	1½	2½	3½	3½	3½	3½	3½	3½	3½	3½	4½	4½	4½
High Carbon Steel Gr.	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½	2½	3½	3½	3½
Nickel Steel Alloy Gr.	1½	1½	1½	2½	2	2	2	2	2	2	2	2½	2½	2½

3 G C

4 G C

5 G C

6 G C

7 G C

Fig. 2—Feed Data for Carbon Steel Gear Cutters

steel and the rate of feed is dependent upon the speed the cutter can stand. It will be noticed that the rates of feed for the carbon steel cutter are 35 ft. per min. for cast iron and 30 ft. for steel, while for high speed steel cutters the rates are 55 and 80 ft. respectively. The gear blanks can be made of either hard or soft cast iron, low or high carbon steel or nickel alloy steel, the variation in the rate of feed, according to the different materials, being apparent from examination of the two charts. The shape of the gear may be such that high speeds or feeds cannot be employed, due to a light design and large diameter, or the design may be such that, irrespective of the fact that the material itself is very hard, it is possible to employ heavy feeds and fast speeds. If great accuracy of finish is not required one cut may be used instead of two. The shape of the cutter may be such or the teeth may not be strong enough to permit a heavy cut to be taken, and at the same time the face of the cutter teeth may not have the proper angle to enable the chips to free themselves, which also has a retarding effect upon the cutting operation. The kind of lubricant used in cutting gears, such as lard oil, oil cutting compound or water cutting compound, also exerts an influence in the time element by controlling the rates of speed and feed that can be employed.

It will be noticed that feeds of the No. 7 cutter for a single finishing cut are not given, as the builder does not believe it possible to get proper results with one cut on this size. The shearing tooth cutter for the roughing cut referred to on the charts is simply an ordinary gear cutter with an even number of teeth, with the face of the cutter teeth ground alternately at an angle of 11 deg., so that a cut similar to that of a side-nosed tool in a lathe is taken.

Record Output for a 50-Ton Basic Furnace

In the week ended July 19, 1913, the Lukens Iron & Steel Company, Coatesville, Pa., in its No. 2 open-hearth plant, one of the 50-ton furnaces (No. 14) made 17 heats, producing 865.04 gross tons of steel. At this plant cold metal is used entirely, thus making a new record and remarkable tonnage for this practice. On Saturday, July 12, a layover heat was charged and the gas was taken off the furnace till 9 a. m. July 13. This heat was tapped at 7.15 p. m. July 13. It was in the furnace 24.45 hr. The seventeenth heat was tapped at 7.45 p. m. July 19. The time per heat in the furnace is appended:

Melt No.	Hr. Min.	Melt No.	Hr. Min.
14,840	24 45	14,849	8 50
14,841	10 25	14,850	9 45
14,842	9 25	14,851	8 00
14,843	7 45	14,852	9 00
14,844	9 15	14,853	8 15
14,845	9 30	14,854	7 35
14,846	7 40	14,855	8 10
14,847	9 30	14,856	8 00
14,848	8 50		

Thus 16 heats were made (excluding layover heat) in 144.30 hr.; excluding delays, in 139.55 hr. Average time per heat was 8.45 hr. Average tons per heat were 50.88. W. H. Hamilton is general superintendent and G. A. Forbes superintendent of the open-hearth department.

The annual meeting of stockholders of the Youngstown Sheet & Tube Company was held at Youngstown, Ohio, on Tuesday, July 22. The old board of directors was re-elected, with the exception that George E. Day, who was formerly manager of sales, was elected a director. The directors are now as follows: James A. Campbell, C. D. Hine, Robert Bentley, H. G. Dalton, H. H. Stambaugh, J. L. Severance, J. G. Butler, Jr., E. L. Ford, Henry Wick, George E. Day and Richard Garlick. The old officers were all re-elected at a subsequent meeting of the board, at which it was decided to pay the company's employees 6 per cent. on their wages for the year ended June 30 as their participation in the profits. The payroll of the company for that year was \$6,612,683.20.

The report that the Brier Hill Steel Company, Youngstown, Ohio, will build a new plant to have 20 hot sheet and black plate mills is officially denied. The only new construction the company has under way at present is the open-hearth steel plant at West Youngstown, which is expected to be ready to make steel about November.

Deserting an Iron Ore Town

Champion Mine Long Shut Down, but Like Other Old-Range Mines It Has a Future

MARQUETTE, MICH., July 21.—Due to the continued idleness of the United States Steel Corporation's Champion mine, practically the town's sole support, Champion, on the Marquette iron range, is gradually becoming a deserted village. The mine has been closed for many months and previous to its entire suspension it had been operated only on a small scale for several years. The miners have sought livelihood elsewhere, and their families are now joining them. Already more than 50 per cent. of the dwelling houses have been vacated. Many of these buildings are owned by men employed at the mine in the palmy days of the town, who invested their savings in homes.

The Steel Corporation has no present need for Champion ore. It is concentrating its mining activity on the Mesaba range and it is hardly expected that the Marquette range property will be restored to the producing list until the lease to the Hill lands in Minnesota has expired and these holdings have reverted to the Great Northern interests. The Champion is owned by the corporation in fee. A large amount of ore is in stock, some of it taken out as long ago as fifteen or twenty years. The Champion is about the deepest mine in the Marquette district. The bottom level is down 2000 ft. The mine has shipped to date a total of 4,415,000 tons of ore. There are fully 3,000,000 tons remaining in the deposit, with a possibility of discoveries augmenting the extent of the reserves. The Champion is generally credited with an assured future life of a quarter of a century.

The Champion is not the only Marquette range property of the Steel Corporation that is closed down. The Section 21 mine at Ishpeming is also inactive, and other producers in the district are not being wrought as vigorously as they might be, were not the operations on the Hill lands engrossing so much attention. The Ishpeming field is long-lived. Ore has been produced for more than sixty years and no doubt ore will be shipped for another sixty years. Every mining organization keeps a large force of men looking for new deposits, underground and surface explorers who, with diamond drills, rock drills and hand hammers, are everlastingly looking into the rocks for ores to take the place of those being sent to market. The deposits occur in pockets of varying size. There are no regular veins. Thirty years or more ago considerable test-pitting was done in the vicinity of Lake Sally and Iron Mountain lake, whence Ishpeming now derives its water supply. Some ore was taken from surface showings, but no mines of value were developed. Today the Jones & Laughlin Steel Company is conducting diamond drill explorations on the southwesterly shore of Iron Mountain lake. It is a theory that the main ore concentration in that particular locality will be found under the waters of the lake, as was the case at Lake Angeline, now long drained and years ago Ishpeming's source of water supply.

Two or three miles east of Ishpeming is the Jackson mine, at Negaunee. It was here that the first iron ore was discovered in the Lake Superior region. That was in 1844. The Jackson has produced more than 4,000,000 tons of ore to date, yet it cannot be said definitely that much more ore will not still be taken from it. At present the only mining being done is on a lean ore formation known as the South Jackson. The great bulk of the Jackson output to date has come from hard ore deposits in upper horizons. Soft ores are believed to exist at depth, however, as has been indicated by diamond drilling at the northwest corner. This drilling has apparently shown a continuation of the deposits mined in the adjoining Lillie and Cambria properties and it is not improbable that eventually the Jackson will again become an important producer. The tract was acquired by the Cleveland-Cliffs Iron Company several years ago. It comprises an entire section of 640 acres.

The Globe Iron Company's furnace, at Jackson, Ohio, which has been idle since June 1, 1912, for extensive repair, has been blown in on silvery iron.

American Electrochemical Society's Colorado Meeting

The twenty-fourth general meeting of the American Electrochemical Society will be held in Denver, September 9, 10 and 11, 1913. A preliminary programme presents the following arrangements:

Tuesday, September 9: Morning session in Denver for the reading and discussion of papers. For the afternoon various visits are being arranged. In the evening an informal smoker will be held.

Wednesday, September 10: An early car will be taken for Boulder, where a session for the reading and discussion of papers will be held at the University of Colorado. After lunch automobiles will be taken up Boulder canyon to the power plant of the Central Colorado Power Company, at the entrance to the Boulder tungsten district.

Thursday, September 11: In the evening a session will be held for the reading and discussion of papers at the School of Mines in Golden. For the afternoon various visits are being arranged. In the evening an informal picnic dinner will be held on Lookout Mountain.

Friday, September 12: In the morning the return trip will be begun, which will take the party first to Colorado Springs. In the afternoon a trip will be made up Pike's Peak, where it is intended to hold the concluding session of the meeting.

Saturday, September 13: A further side trip will be made from Colorado Springs to the gold district of Cripple Creek.

According to present indications the attendance will be large and it is hoped that it may be possible to start the special train from New York City (which will be the first electrochemical train ever arranged), leaving the Grand Central Terminal on Saturday, September 6, at 10.30 a. m., arriving in Chicago on Sunday, 7.59 a. m., leaving Chicago over the Burlington at 9.45 a. m. and arriving in Denver on Monday, September 8, at 1.15 p. m. The chairman of the Transportation Committee is J. M. Muir, 239 West Thirty-ninth street, New York, from whom any additional information concerning transportation may be obtained. Dr. E. F. Roeber, editor of Metallurgical and Chemical Engineering, New York City, is president, and Dr. J. W. Richards, Lehigh University, South Bethlehem, Pa., is secretary of the society.

Improvements in Case Hardening

In a paper entitled "Some Recent Improvements in Case-Hardening Practice," read at the Chemical Industry, Engineering and Foundry Exhibition in London by H. L. Heathcote, chief research chemist to Rudge-Whitworth, Ltd., the author described his investigations with colored solutions, his object being to find a series of solutions of different absorbent powers, capable of absorbing all the colored rays from red-hot bodies. Certain dyes were selected and combined to give the absorption required, when calibration was effected. The device he now uses has a stereoscope type of eye-shield to guard the eyes from extraneous light, and instead of two lenses there were two pairs of dye-solutions, well protected by caps, which also kept side light out. With it he could control a case-hardening temperature by using, for example, two pairs of cells, one adjusted to 900 deg. C. and the other to 920 deg. C., when if the pots were visible through the 900 deg. pair, and invisible through the 920 deg. pair, the required temperature was attained. The hardening temperature was reached as soon as the work appeared just visibly red. Mr. Heathcote described some experiments which led to the discovery of a case-hardening composition, far more permanent than that in current use, and capable of being adapted to give a range in concentration of case. With this composition the time required for carburizing could be materially reduced.

French Iron and Steel Output in 1912.—The latest returns regarding the iron and steel industry of France for 1912 show it to be one of the most active and prosperous periods. The production of iron ore was 18,795,000 metric tons in 1912, a gain of 2,155,000 tons over 1911. The output of pig iron during 1912 was the largest recorded, amounting to 4,949,000 tons, or 479,000 tons more than in 1911 and 1,549,000 tons more than in 1908. New blast furnaces are expected to increase this total to 5,500,000 tons by 1915. Steel ingot production was 4,404,000 tons in 1912, against 3,837,000 tons in 1911, while the finished steel products amounted to 3,029,000 tons in 1912 and 2,638,000 tons in 1911.

Maintaining Piece-Work Prices

A large Central Western manufacturing company adopted a policy which has worked well since the adoption of the piece-work system in its foundry. Ordinary laborers do not participate in the scheme, as it applies only to skilled workmen. The company attributes its success to the rule that has been rigidly adhered to, since piece-work was introduced several years ago, of paying the scale of prices originally agreed upon. No matter how much a workman may make, he is encouraged to increase his earnings. The schedule is first carefully figured out by the superintendent and his assistants.

How both manufacturer and employees profit by the plan is shown by an example. On the 15-in. molding machines the men were formerly paid \$2 a day, and the average output was only 18 flasks. Under the new rule 6 cents a flask is paid, and in the same working time the operators turn out an average of from 45 to 75 flasks a day. On the 22-in. machines in this foundry, formerly only 8 to 10 flasks represented the average for a day's work, and in operating these machines a helper at \$1.75 per day was required. Under the new system 12 cents a flask is paid and the output ranges all the way from 25 to 40 a day, although the company pays the helper for molders operating the larger machines. A simple calculation shows that under the old system the costs of flasks on the 15 and 22-in. machines were respectively 11 cents and 20 cents each. The new plan has materially reduced this cost, and at the same time it has increased the output of the foundry with the attendant reduction in the overhead charge against each unit of product.

The New Noble & Westbrook Factory

The new factory of the Noble & Westbrook Mfg. Company, located on the east side of Westbrook street, near Burnside avenue, Hartford, Conn., is fast approaching completion. The building is 30 x 70 ft., brick, mill construction, two stories and basement, with numerous windows. The basement contains a fireproof vault. The office, machinery, engravers' room, stock room and a second vault are located on the second floor. Light for the engravers is obtained from a northern exposure, coming from seven large windows. The second story will be used for the storage of such articles as patterns and spare equipment not in constant use.

The company was incorporated May 8, and is the successor to the firm of Noble & Westbrook, organized eight years ago. The firm was located for a time at 177 Asylum street and later at 9 Asylum street, still maintaining a sales office at the latter place. The business consists mainly of manufacturing marking devices, the cutting and engraving of steel dies, and the making of metal checks, burning brands, stencils, rubber stamps, brass signs and seals. The officers are: President, George Westbrook; vice-president, G. O. Carlson; treasurer, Richard H. Noble; secretary, Daniel D. Bidwell. The company owns the exclusive right to manufacture the Dwight Slate marking machines, for which there is a wide market, some having been lately sent to Australia and several to London, England.

Motor Trucks on Highways

W. A. Lee, Troy, N. Y., the owner of a KisselKar truck that has been demonstrating convincingly the value of motor haulage, comments interestingly as follows on the unjust assertion that motor trucks ruin the highways: "Stand on any state road after a three or four days' rain and watch a farmer coming in with 25 barrels of potatoes on a wagon equipped with a 1½ or 2-in. tire worn round, and see it cut in. Then along comes a heavy touring car equipped with chains, running in the same rut, throwing cement, if there ever was any, in all directions. After that comes our KisselKar truck with its 1-ft. tire, and packs down and smoothes out the rut. Watch the truck come up the road at 10 or 12 miles an hour, for there is a governor which regulates our speed. We can't go faster. Then decide which vehicle injures the road the most."

The largest steam turbine ever built is reported under construction by Brown-Boveri & Co., of Baden, Germany. It is for a power station at Hagen, Westphalia, and is of 40,000 hp.

July 31, 1913

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

EMPLOYER'S RESPONSIBILITY.—An iron worker was injured through the breaking of a hook suspending a scaffold on which he was seated. He had previously sent his helper for the hook. A blacksmith employed by the company, after heating the iron from which the hook was constructed, permitted the helper to plunge it into cold water, thus tempering it too highly, as a result of which it broke. Held, that the negligence was that of the blacksmith, attributable to the company as its representative in furnishing appliances for plaintiff's use, and not that of the helper, plaintiff's fellow employee, for whose negligence the company would not be liable. (Missouri Court of Appeals, Scheidler vs. Missouri Boiler & Sheet Iron Works, 155 Southwestern Reporter 897.)

PROTECTION OF TRADE SECRETS.—Courts will protect a manufacturer's trade secrets by enjoining an employee from disclosing or using them, after having learned them in the course of confidential employment. The injunction may also be extended to prevent third persons from disclosing such secrets after having wrongfully induced the employee to disclose them. To entitle the complaining manufacturer to this relief, he must establish his right to the secret and show that it was communicated to the employee under such circumstances as to make it inequitable for the latter to disclose it. (Pennsylvania Supreme Court, Macheth-Evans Glass Company vs. Schnellbach, 86 Atlantic Reporter 688.)

ACT CONSTITUTING CONVERSION.—A custom house broker paid the duty on a quantity of imported pig iron for the owner and employed a lighterage company to transport the iron to the place designated by the owner, but, through mistake of the company's captain, the iron was delivered to a third party, with whose iron the particular quantity was so intermixed that its identity was lost. Held, that the third party's refusal to redeliver the iron on demand constituted an actionable conversion. (New York Supreme Court, First Appellate Division, Samuel vs. Holbrook, Cabot & Rollins, 141 New York Supplement 275.)

GIVING A NOTE AS WAIVER OF SELLER'S WARRANTY.—A buyer of a machine waived warranty of its efficiency by the seller, by giving a note five months after the machine was installed for the purchase price, without any claim of a breach of the warranty. (Maryland Court of Appeals, Louis Eckels & Sons Ice Mfg. Company vs. Cornell Economizer Company, 86 Atlantic Reporter 38.)

LIABILITY FOR INJURY TO EMPLOYEE ON PRIVATE RAILROAD.—The statute in force in Indiana making railroad companies liable for negligent injury to their employees applies to a manufacturing company which operates locomotives and cars on a private railroad used in its business, operated in such manner as to subject the employees in that department to substantially the same dangers as are incident to the operation of commercial railroads. (Indiana Appellate Court, American Car & Foundry Company vs. Inzer, 101 Northeastern Reporter 676.)

CONCLUSIVENESS OF BILL OF LADING.—The statements of a bill of lading as to the articles received by the carrier for transportation are not conclusive upon the shipper. A bill of lading partakes of the nature of a receipt, and is prima facie evidence only that the articles alleged to have been received by the carrier were, in fact, received; and the holder may show, if he can, that the bill of lading does not evidence the acceptance of all the articles that were delivered to the carrier. (Georgia Court of Appeals, Atlantic Coast Line Railroad Company vs. Hill, 77 South-eastern Reporter 316.)

CONTRACTS NOT TO RE-ENGAGE IN BUSINESS.—While every contract under which the seller of a business binds himself not to re-engage in the same line must be no broader as to territory than is reasonably necessary to protect the buyer against competition on the seller's part, the territory may include an entire State, or even a wider area, if the business done by the seller has been co-extensive with such territory. (Colorado Supreme Court, Barrows vs. McMurty Mfg. Company, 131 Pacific Reporter 430.)

RESPONSIBILITY FOR ARREST BY SPECIAL POLICE OFFICER.—The employer of a special police officer is liable in damages for an unlawful arrest made by him. (Texas Court of Civil Appeals, Perkins Brothers Company vs. Anderson, 85 Southwestern Reporter 556.)

CORPORATION NOT LIABLE FOR INTEREST ON DIVIDENDS.—A stockholder who neglects to collect a dividend after it has become payable is not entitled to interest thereon for the time that the money remains in the corporation's hands. (Maryland Court of Appeals, Baltimore Trust Company vs. George's Creek Coal & Iron Company, 85 Atlantic Reporter 949.)

NEGLIGENCE OF CONTRACTOR PRESUMED.—That a building contractor's employees permitted a piece of structural iron to strike a pipe constituting part of the sprinkling system of an iron works company, for which an addition to its building was being erected by the contractor, resulting in damage to the company, is presumptive evidence of negligence, placing the burden on the contractor to show that his employees used due care. (Maryland Court of Appeals, Chesapeake Iron Works of Baltimore vs. Hochschild, Kohn & Co., 86 Atlantic Reporter 345.)

ELECTION OF LEGAL REMEDIES.—That suit was brought against the president of a company on a note given for the price of a machine did not preclude subsequent suit against the company itself for converting the machine against the seller's rights. (Kentucky Court of Appeals, Joseph Goldberger Iron Company vs. Cincinnati Iron & Steel Company, 154 Southwestern Reporter 374.)

WAIVER OF WARRANTY BY BUYER.—A seller of an engine is not liable as for breach of warranty as to its efficiency, if its failure to work properly is due to alterations in connections made at the direction of the buyer and not contemplated by the contract of sale. (St. Louis Court of Appeals, Fairbanks, Morse & Co. vs. Mercurio Brothers, 154 Southwestern Reporter 425.)

RIGHTS OF THIRD PARTIES AS TO MACHINERY INSTALLED.—Where machinery installed in a building is sold and part of it is removed, a subsequent purchaser of the building is not entitled to claim the remaining machinery. (Pennsylvania Supreme Court, Igoe vs. Hansen, 85 Atlantic Reporter 1131.) When machinery is sold under a contract reserving title in the seller until payment of the price and it is installed on mortgaged real estate, the mortgagee is not entitled to claim the machinery as a part of the premises, if it can be removed without substantial injury to the building, or to the mortgagee's security existing when the machinery was installed. (Kansas City Court of Appeals, Fred W. Wolf Company vs. Hermann Savings Bank, 153 Southwestern Reporter 1094.)

VALIDITY OF CONDITIONAL PROMISE TO PAY.—Provision in a contract of sale that the buyer shall pay for the articles only in the event that he derives a certain profit from them within a certain time is valid and enforceable. (Alabama Court of Appeals, Cochran vs. Burdick Brothers, 61 Southern Reporter 29.)

EMPLOYER NOT BOUND TO INSPECT SIMPLE TOOLS.—An employer is not liable for injury to a worker caused by the head of a hammer flying off the handle while being used by a riveter. The employer does not owe his workmen any duty to inspect such simple tools as a hammer. (Indiana Appellate Court, American Car & Foundry Company vs. Fess, 101 Northeastern Reporter 318.)

WORKMAN'S RIGHT TO WARNING.—An employer must warn a workman against any tendency of a machine, at which he is required to work, to start automatically, unless the latter knows that fact. (Massachusetts Supreme Judicial Court, Dagis vs. Walworth Mfg. Company, 100 Northeastern Reporter 620.) Unexplained automatic starting of a machine affords presumptive evidence that it has been negligently permitted to remain in a defective condition. (Same court, Cook vs. Newhall, 101 Northeastern Reporter 72.)

INJURY CAUSED BY DEFECTIVE ELECTRIC EMERY WHEEL.—A workman cannot recover for injury resulting from a shock received while using an electric emery wheel, if it is not shown what particular defect in the appliance permitted electricity to escape, and if it appears that the employer used customary and approved methods of inspection to discover any defective condition. (United States Circuit Court of Appeals, Eighth Circuit, American Car & Foundry Company vs. Dietz, 203 Federal Reporter 469.)

CONTRIBUTORY NEGLIGENCE OF OILER.—An oiler of machinery cannot recover for injury received through carelessly permitting the nozzle of his oil can to come in contact with machinery revolving in plain view. (Massachusetts Supreme Judicial Court, Miller vs. Mead-Morrison Mfg. Company, 100 Northeastern Reporter 1087.)

PATENTEE'S RIGHT TO RECOVER FOR INFRINGEMENT.—A patentee is not precluded from recovering profits made by an infringer, because he has not utilized the patent himself. (United States Circuit Court of Appeals, Third Circuit, Carborundum Company vs. Electric Smelting & Aluminum Company, 203 Federal Reporter 976.)

TENDER OF RETURN OF DEFECTIVE MACHINERY BY BUYER.—When machinery is sold under warranty and any defective condition is not discoverable until installation the buyer, on the machinery proving to be defective, need not tender the machinery back at the seller's place of business in order to recover payments made on the purchase price and notes given for a balance. (Kansas City Court of Appeals, City Light, Power, Ice & Storage Company vs. St. Mary's Machine Company, 156 Southwestern Reporter 83.)

RISKS ASSUMED BY MACHINE OPERATORS.—An employee engaged to operate machinery assumes the risks ordinarily incident to his work. (Texas Court of Civil Appeals, Taylor vs. White, 156 Southwestern Reporter 349.)

INJURY TO WORKMAN IN TANK.—An employee engaged in the bottom of a tank in adjusting timbers did not assume the risk of being injured through fall of timbers which were being lowered, where he could not perform his duties and at the same time see to the lowering of timbers. (Kentucky Court of Appeals, United Iron Works Company vs. Bowling, 156 Southwestern Reporter 124.)

RECEIPT OF CHECK AS FULL SETTLEMENT OF ACCOUNT.—A creditor's acceptance of a check mailed in a letter stating that it was tendered "in settlement of the amount still due you according to the statement of account inclosed, which you will kindly carry to the credit of our account," does not prevent the creditor from claiming that the account was not settled in full by such check, if he gives prompt notice of such claim on receiving the remittance. For a part payment to constitute a settlement in full, it must be made on the express condition that, if accepted, it shall constitute full satisfaction. (Pennsylvania Supreme Court, Anonyme Pour la Fabrication de la Soie de Chardonnet vs. Loeb, 86 Atlantic Reporter 798.)

ACCEPTANCE OF ORDERS FOR GOODS.—A manufacturer in suing on a contract by defendant to buy machinery, under an order which recited that the contract was subject to the approval of the manufacturer's president or secretary, must show such approval or there can be no recovery. (South Dakota Supreme Court, Thomas Mfg. Company vs. Lyons, 141 Northwestern Reporter 391.)

PASSING OF TITLE UNDER CONTRACT OF SALE.—Under an ordinary contract to sell goods to be shipped to the buyer delivery to the carrier passes title to the buyer, and title does not revert in the seller on the buyer refusing to accept delivery of the goods on their arrival. (Connecticut Supreme Court of Errors, Home Pattern Company vs. W. W. Mertz Company, 86 Atlantic Reporter 19.)

AUTHORITY OF COLLECTORS.—A collector is impliedly authorized to accept security for the payment of a debt due his employer, but not to accept payment in anything else than money. (Texas Court of Civil Appeals, Rotan Grocery Company vs. Jackson, 153 Southwestern Reporter 687.)

New Tools and Appliances

This is essentially a news department for which information is invited

Rotary Vibrating Riveting Machine.—A recent product of the Grant Mfg. Company, Bridgeport, Conn., is a rotary vibrating riveting machine of the light bench type. It has a capacity of $\frac{1}{8}$ in. and is capable of operating in close corners and similar places, which it is practically impossible to reach with a regular machine. An eccentric and a vibrating hickory helve operate the spindle of the machine, a rubber ball being interposed between the top of the spindle and the end of the helve. A worm and worm gear, the former having a four-step grooved cone pulley, which is driven by a round belt from the main spindle, rotate the riveting spindle. The machine is driven by a $\frac{5}{16}$ -in. round belt from a grooved pulley on the countershaft, running around a loose friction-driven pulley on the machine. This pulley normally runs idle and is brought into action by depressing a foot treadle. As soon as the pressure on the treadle is released, a brake is automatically applied to the shaft that stops the machine almost instantaneously. The machine is practically noiseless except when the rivet is being headed and at this time a slight hum is noticeable.

Ball Bearing Drilling and Tapping Machine.—The Kern Machine Tool Company, Hamilton, Ohio, has brought out a ball bearing, sensitive drilling and tapping machine, the general construction of which is similar to the standard lines of the company. The belt shifting device is telescoped, thus making it possible to operate either side of the machine independently and one of the pulleys is fitted with expanding ring friction clutches instead of a positive clutch, an arrangement which makes the machine available as a tapping machine with quick return to the spindle. When no tapping is to be done, the head can be used for high speed drilling with the regular number of changes. In this case, the large tight and loose pulleys are changed or an adjustable-speed motor is used. For a direct belt drive various diameters of lineshaft pulleys can be used

to secure the necessary speed variations, in addition to the four changes provided for each spindle.

A Broaching Machine with Motor Drive.—The LaPointe Machine Tool Company, Hudson, Mass., has lately placed on the market a motor-driven broaching machine having a 50-in. stroke. The driving screw is 2 in. in diameter and the geared return drives through a friction clutch, the rate being 240 in. per min. The machine is directly connected to a constant-speed motor, which gives a cutting stroke of 54 in. per min. In a recent test seventy brass pieces with holes $1\frac{1}{8} \times 2\frac{1}{8} \times 3\frac{1}{4}$ in., the last dimension being the length, were broached in 1 hr. and while accurate finishing was not required, the holes were within 0.003 in. on about 4000 pieces.

A Double End Wet Tool Grinding Machine.—To meet the demand for a universal grinding machine for comparatively small tool work, and one which would at the same time be adapted for typewriter and similar processes of manufacturing, the Sterling Grinding Wheel Company, Tiffin, Ohio, has developed a double end wet grinding machine. The water for the wheels is supplied by a device inside the base which does away with the pumps and also enables the machine to be operated either as a wet or a dry grinding machine. Wheels 10 in. in diameter with a 1-in. face can be used by the machine which occupies a space of $14 \times 23\frac{1}{2}$ in.

Gear Hobbing Machine.—For automatically generating spur, spiral or helical gears up to a maximum diameter of 12 in., the Boston Gear Works, Norfolk Downs, Mass., has brought out a new hobbing machine. It can be used also for cutting worm gears up to 12 in. in diameter without automatic feed, and will cut single thread worms or screws up to a maximum diameter of 2 in. and a maximum length of 24 in. For cutting helical gears of either the right or left hand type, the cutter head can be swung to any angle. There are only two driving members in the cutter head, and to secure stiffness, the overhang of the hob arbor has been reduced to a minimum. The hob is held practically vertical when in the cutting position, which permits the chips to clear themselves and be taken care of below the machine. The machine is driven by a constant-speed single pulley drive, the necessary speed variations being obtained by a change gear device. Any number of teeth up to 100 can be cut and by compounding it is possible to secure even numbers over 100. The machine weighs about 1500 lb. and occupies a floor space of 40×50 in.

Recent Machinery Auction Sales

J. E. Conant & Co., auctioneers, Lowell, Mass., furnish the following information regarding the sale of the business and plant of H. G. Barr, Worcester, Mass., July 8; of the business and plant of the Noye Mfg. Company, Buffalo, N. Y., July 10, and of the plant of the Ball-Wood Engine Company, Elizabethport, N. J., July 22.

Each sale was largely attended by consumers and users of such property as well as machinery dealers and agents. In each instance there were several bidders for lots comprising "the right to manufacture, the name, the good will, the patents, the patterns, the jigs, the stock in process of manufacture, etc.," which were bought by the separate purchasers for the purpose of the continuation of the manufacture of the several products. At each of these three sales the demand for the machine tools, general machinery and mechanical equipment and other personal property was the equal of the demand at any sale, possibly with a single exception, of which the firm has knowledge, within the past five years. It was noteworthy that the speculators and dealers were constantly outbid.

The right to manufacture the H. G. Barr tools was purchased by a competitor, Harding Allen, of Worcester, and the purchaser of the right to manufacture the Wilson and the Noye steering gears, radiators, etc., was the Roberts garage, Buffalo. The average price paid for the machine tools (light equipment) at the Barr sale was \$133.33; the average for the machine tools (old equipment) at the Noye sale was \$181.40; the average for the machine tools (heavy equipment) at the Ball-Wood sale was \$499.44. Some of the heavy machine tools at the last-named sale brought \$2625, \$2525, \$1825, \$1087.50, \$987.50, \$900, \$862.50, \$850, and so on down to \$500.

The Reeves Mfg. Company's Expansion

The Reeves Mfg. Company, Canal Dover, Ohio, manufacturer of black and galvanized sheets, charcoal-iron pipe, sheet-metal building material and stove pipe and flues, has increased its capital stock from \$500,000 to \$1,000,000, the additional capital being necessary to take care of its growing business and also of some extensive improvements and additions to its plant that are now under way. It is adding a building, 100 x 200 ft., to its roofing department; another building, 100 x 200 ft., to its sheet mill, and a third building, 100 x 200 ft., for its skelp mill. It is also adding equipment for making a large quantity of black sheets for automobile bodies, metal furniture, etc. A new train of rolls is being added to the skelp mill and a new engine installed for running this equipment in tandem. The company will add the manufacture of stack plate and grooved iron and steel skelp and also sheet bars, selling its surplus product in the open market. It has increased its black sheet department to six hot mills and has added another galvanizing pot, making three in all. H. G. Grier is president; James Rees, vice-president; A. J. Krantz, treasurer and general manager; J. A. Krantz, secretary.

Manganese Ore in Australia

According to the Iron and Coal Trades Review, London, Australia is developing large deposits of manganese and hematite ores. The owner is the Victorian Manganese Mines Iron Steel Company, London, which has spent £70,000 in proving the mines. It is stated that there are 40,000,000 tons of a high grade manganese ore containing 88.60 per cent Mn O₂; also immense quantities of hematite ore running 69.33 per cent iron and low in phosphorus and sulphur. The deposits are 38 miles from the port of Colquhoun. Large supplies of limestone are also at hand and good coking coal is available at a reasonable cost. The average price of the manganese ore delivered in Great Britain is estimated at 32s. to 35s. per ton plus the profit to the company. It is further calculated that ferromanganese could be manufactured at the site and delivered in Great Britain at 90s. per ton. The company proposes to build a railroad from the mines to the coast and eventually to form a large company to manufacture steel products.

The Akron Gear & Engineering Company, Akron, Ohio, maker of cut gears, tire molds, and engine and general repair work, incorporated a year ago with a capital of \$20,000, has been successful from the start. Owing to the heavy increase in its business, it has been found necessary to install more machinery, and the stockholders have voted to increase the capital to \$50,000. Part of the new stock will be sold and the remainder held in reserve. J. Asa Palmer is president; W. F. Warden, first vice-president; T. A. Seacrist, second vice-president and assistant secretary; Otis E. Prier, secretary and treasurer, and Jesse R. Triplett, general manager. W. F. Warden is also president and general manager of the Burt Mfg. Company, Akron, and J. Asa Palmer is secretary and assistant general manager of the same concern.

The Interstate Commerce Commission has further suspended from July 30, 1913, until January 30, 1914, the operation of a provision changing the classification of bridge iron and bridge material, carloads, in a tariff filed by the Louisville & Nashville Railroad. The provision in question would have the effect of increasing rates applicable to the transportation of the commodities named over the lines of this railroad. Its operation was originally suspended from April 1 until July 30, 1913.

The Southern Pacific Company is said to be saving \$1000 per month by using old boiler tubes. They are no longer sold as scrap but are being used for piping water and air about the yards of the company. The tubes are collected, shipped to the general stores, cleaned, turned for screw connections, and then sent out for pipe purposes instead of new material.

The Perry furnace of Pickands, Mather & Co., at Erie, Pa., which has been out of blast for relining, is scheduled to be blown in next week.

Fatigue in Ship Steel

In a paper by Dr. S. J. P. Thearle, read before the Institution of Naval Architects, Glasgow, Scotland, evidences of what is commonly known as fatigue of metals were discussed. He stated that from time to time such cases were disclosed when surveying steel vessels under repair, but that during the last year or two phenomena of the kind have been particularly observed. The cracks extend right through the plates, and the amount of wasting by corrosion shows that the cracks are not of recent date. They did not break into rivet holes nor were they near the edges of the plates. Careful investigation showed that these cracks were the result of fatigue in the material of the margin plates, due to frequent alternating pull and push stresses continued over a long period. The cases in which the phenomena occurred had certain features in common pointing to a common cause. The remedy is to alter certain methods of construction. Up to the present time about 29 vessels have been found under survey to have been affected in this way. All are steamers of 3000 to 5000 tons gross register. Their ages range from two to 16 years, the average age being nine. They are of all types and all of steel and are products of 13 different builders and seven different ports. Certain features are common to all cases. The primary cause is evidently slight local movement frequently repeated and extending over a long period of time. In all cases of such fatigue, tensile and other tests made upon material cut from the vicinity of the cracks show no abnormal conditions, but give the ordinary results of good mild steel for shipbuilding purposes. This would seem to show that the effects of fatigue are practically limited to small portions of the material.

Our Foreign Parcel Post Service.—The Postal Progress League, 125 East Twenty-third street, New York, is making a vigorous campaign for the extension of our foreign parcel post service. In a recent bulletin it gives a striking example of the manner in which manufacturers in Germany are favored by having lower export parcel rates than the United States to countries in Central and South America. The example is furnished by the firm of Lord & Taylor, New York, who conduct business in both this country and Germany. The rate on their 11-lb. parcels from Germany to Cuba is 50 cents; to Costa Rica, 55 cents; to Mexico, 55 cents; to Nicaragua, 85 cents; to Panama, 60 cents; to Uruguay, 85 cents, and to Colombia, 90 cents. They pay on parcels posted from their American house to these several countries \$1.32 for 11 lb. It is claimed by the League that the President and Postmaster-General can correct this condition of things by making the necessary official declaration, and urge that appeals be made to them by business men to take this step for promoting our trade.

The first sample of radium bromide produced outside of Europe, according to the London Times, has lately been made in Sydney from Australian ores. Its purity is certified to be 98.4 per cent. The plant producing it is capable of turning out 40 milligrams per week.

La Société des Mines et Fourneaux de la Méditerranée, has recently been formed in Paris with a capital of \$1,000,000. Its object is to acquire certain iron mines at Alpujarra, Spain, and to construct a railroad and blast furnace, the latter to be on the seacoast.

The Otis Steel Company, Cleveland, Ohio, has placed with the General Electric Company, Schenectady, N. Y., an order for 146 motors ranging from 5 to 2500 hp., being the complete motor requirements for its new plate mill.

The American Brass Company, Ansonia, Conn., has made arrangements with its subsidiary, the A. B. C. Company, whereby electric power will be obtained with which to run all its plants.

The Webster Mfg. Company, whose works and main office are at Tiffin, Ohio, advises that its Chicago office has been removed from the Fisher Building to 1807 McCormick Building.

Trade Publications

Cold Drawn Steel Pipe Union.—Mark Mfg. Company, Chicago, Ill. Booklet. Illustrates and describes a new type of pipe union which is cold drawn from a flat steel blank. While the union is composed of the customary three parts, it is radically different from every other make, in the method of manufacture, material, details of design, and service rendered. As the union is made of the same material as the pipe with which it is designed to be used, it expands and contracts equally and does away with the trouble encountered due to the unequal expansion of the pipe and the iron unions formerly used. Views of the union, which was illustrated in *The Iron Age*, June 5, 1913, in the process of manufacture, together with some of the departments of the factory, are included.

Drop Forged Wrenches.—Armstrong Bros. Tool Company, 339 North Francisco avenue, Chicago, Ill. Catalogue No. 2. Treats of a line of drop forged steel wrenches which can be furnished either unfinished, semi-finished or finished in a number of different styles and sizes. All of these are illustrated, a separate page, as a rule, being given to each type, with a table of the different sizes in which it can be supplied.

Protected Metal Roofing and Siding.—Asbestos Protected Metal Company, Beaver Falls, Pa. Bulletin No. 16. Illustrates and describes the construction and use of asbestos protected metal roofing and siding, which is a sheet of metal that has been given a rustproof coating and is then coated and hermetically sealed at high temperature and pressure in an envelope of asbestos rock-felt. Mention is also made of various roofing supplies intended for use with this and other of the company's products, and there are a number of views of plants in which it has been used. These include armor plate, fertilizer and smelter and acid establishments.

Soot Blowers.—Diamond Power Specialty Company, 80 First street, Detroit, Mich. Pamphlet entitled "Making Heat Produce." Shows how cleaning the soot from boiler tubes results in the securing of the total amount of heat from the fuel. The results of a number of tests made in actual practice under various service conditions with the company's mechanical soot blowers are given, showing savings of from 6 to 10 per cent. in the amount of coal required. An illustrated appendix showing how mechanical soot cleaning may be applied to various types of boilers forms a part of the pamphlet.

Oxy-Acetylene Cutting.—Davis-Bournonville Company, Jersey City, N. J. Catalogue bulletin No. 1. Illustrates the Oxygraph for cutting steel according to pattern with the oxy-acetylene flame. A description of the device, which is of the pantograph design and is motor propelled, so that it can be driven uniformly at the predetermined speed best calculated for the thickness of metal to be cut, is given, together with a number of views of metal cut. An illustrated description of this device appeared in *The Iron Age*, June 20, 1912.

Industrial Trucks.—George P. Clark Company, Windsor Locks, Conn. Bulletin K. Features a line of trucks which, while designed primarily for paper makers and printers, can also be used in a number of different industries where platform, crated side and shelf trucks can be employed. Views of all of these are given, together with brief descriptions and tables of dimensions.

Gas Engines.—Reading Iron Company, Reading, Pa. Pamphlet. Pertains to the Illmer gas engine, which was illustrated in *The Iron Age*, May 22, 1913. This engine, which is built in sizes from 300 hp. upward, is of the double-acting, two-stroke type and is designed along the lines of the heavy duty Corliss engine. The principal features of this engine are briefly described and mention is made of a gas producer and a gas scrubber for use in connection with the engine, illustrations of both accessories being given.

Open-Side Planing Machine.—Cleveland Planer Works, 3148 Superior avenue, N. E., Cleveland, Ohio. Catalogue. Illustrations and descriptive matter explain the construction and operation of a line of open-side planing machines which will handle work ranging from 30 in. square and 8 ft. long up to 72 in. square and 16 ft. long. The various features of design and construction are touched upon briefly, followed by illustrations of the different machines and the types of drives which can be provided. In addition to the standard open-side machines for handling work larger than 48 in., machines with an outside removable column can be supplied. For very long work, a supplemental rolling table can also be furnished. Tables of dimensions and specifications of the various standard machines are given, together with a complete telegraph code.

Special Washers.—Kales-Haskel Company, Detroit, Mich. Folder. Shows a line of special sheet metal stampings, which includes washers, pipe and wire clips, card holders, ratchet sectors, steel springs, bearing liners and shims, screw machine products, etc. In addition to the stampings illustrated, the company is also prepared to furnish brake bands, fan blades, spanner wrenches, metal shells and stampings for motors, carburetors, lubricators, injectors, axles, transmissions, etc. A list of the sizes of dies regularly carried in stock is given which ranges from 3/64 in. in internal diameter and 3/8 in. in outside diameter up to 7 1/16 and 9/4 in., respectively.

Counters.—Veeder Mfg. Company, Hartford, Conn. Catalogue No. 109. Deals with the company's standard line of instru-

ments, as well as a new line of set-back counters, which are designed for use where it is necessary to have a counter that can be quickly brought to zero from any point to which it has been set. The devices illustrated include all types from an ordinary tally to counters giving two sets of readings. In the latter one set of counter wheels can be set back to zero as often as desired, while the other, which is a totalizer, cannot be adjusted.

Steam Separators.—Harrison Safety Boiler Works, Philadelphia Station, Philadelphia, Pa. Section A of catalogue No. 550. Lists a line of live steam separators for all ordinary pressures, which are made in the horizontal, vertical and other forms, and is the first of a series of sections which will be covering the general line of Cochran steam separators. Suggestions as to the best manner of using steam separators and of the benefits obtained through their use are given, together with views on the efficiency of using dry steam. Views of the various types of separators are given, accompanied by brief dimension tables.

Self-Contained Steam Power Plant.—Buckeye Engine Company, Salem, Ohio. Bulletin No. 10-B. Describes and illustrates the Buckeye-mobile, which is a complete self-contained superheated steam power plant composed of an internally fired boiler, turbine compound engine, superheater, reheater, feed water heater and pumps, either with or without a condenser. It can be used in belt service or with a flexible coupling for direct connection to an electric generator. The construction of the plant is described, and views are given showing the comparative amount of floor space required by a compound condensing plant of the usual type and separate steam-driven auxiliaries and a Buckeye-mobile of equal capacity. The results of a number of tests made are given, together with views of the company's gas and steam engines.

Lathes.—Fitchburg Machine Works, Fitchburg, Mass. Circular Treat of the Lo-Swing lathe which specializes on turning work up to 3 1/2 in. in diameter. A view of the lathe, which was illustrated in *The Iron Age*, April 17, 1913, is given, together with descriptions and illustrations of the various parts, the text having been made up from the standpoint of instructions for operation. A number of pieces turned out are shown, together with illustrated instructions for setting up the lathe and adjusting the different attachments. A brief table of specifications is also included.

Mechanics' Fine Tools.—L. S. Starrett Company, Athol, Mass. Catalogue No. 20. Size, 5 1/4 x 7 1/4 in.; pages, 320. Contains descriptions and illustrations of all kinds of tools for machinists, carpenters, draftsmen, engineers, chauffeurs and other mechanics. Many pages of data and tables, such as metric conversion tables, decimal equivalents, weight computing tables, tapers and angles, wire gauge tables, etc., are included. A numerical index of the different tools is given, together with an alphabetical list of the different ones, so that any desired tool can be located by name or number readily.

Compressed Air Appliances.—Ingersoll-Rand Company, 11 Broadway, New York City. Catalogue No. 9107, superseding No. 9007. Size, 6 x 9 in.; pages, 104. Is really an encyclopedia telling of the many uses of compressed air in the different fields in addition to illustrating the entire line of the company's products. Dimensions and capacity tables are given with each type of machine to aid the purchaser in selecting a machine of a specified type and size to meet certain requirements. Half-tone and line drawings of the various machines are given, together with about 26 pages of tables of useful information.

Pipe Indicator and Lamp Guard.—W. N. Matthews & Brothers, 3722 Forest Park boulevard, St. Louis, Mo. Two leaf catalogue pages. One relates to a lamp guard, which is designed to clamp on the socket and lock the lamp in place to prevent unauthorized removal. These guards are made in three sizes and three weights, a list with prices being given. The other page deals with a simple, self-contained instrument for locating the path of metal pipes, conduit, cables, I-beams, etc., that are within 7 ft. of the finding coil. In use, the terminals are attached to the pipe or object, the path of which it is desired to find, at two accessible points, and moving the exploring coil around near the supposed path of the pipe or object. As long as the coil is out of the path, a humming noise will be heard in a watchcase telephone receiver connected to the instrument, the path of the pipe being marked by a line in which no sound is heard.

Halowaxes.—Condensite Company of America, Glen Ridge, N. J. Pamphlet. Deals with a line of substances to which the trade names Halowax Oil and Halowax have been given. These are chlorine substitution products, having the unique properties of non-inflammability, high boiling points, and a wide range of melting points. Among the uses to which these products can be put are in connection with baking varnish and japanning compositions, for impregnating wood and fireproofing fabrics, for laboratory and factory use where resistance to acids and alkali is needed, for stack paints and roofing, in varnishes and paints and for fire-extinguishing compounds. A brief description of the various products with their properties is given and a comparative table, showing the physical characteristics, specific gravity and melting and boiling points is also included.

The Machinery Markets

Quiet trade conditions such as are usual in summer prevail rather generally, although reports from the South and the Southwest indicate that those sections are fairly busy. Elsewhere business is dull and irregular. New York is quiet again after a short period of fair activity, inquiries being lacking as well as sales, and not much betterment is looked for before September. Conditions are irregular and on the whole quiet in Philadelphia. The market is not active in Cleveland and practically all effort is being put forth on old propositions in the absence of new ones, and there also improvement is not expected until the vacation season is over. The molders' strike in Cincinnati has caused one machinery manufacturer to shut down and others may follow, while trade is being hampered still further by a teamsters' strike, though the strike effects are minimized by summer dullness. After a period of quiet some improvement is noted in Chicago because of an increased number of scattered orders. The Central South has been holding up well and to the satisfaction of dealers and manufacturers, although trade is not as heavy as it was in the spring or will be a month or two later. Trade in St. Louis is fairly satisfactory for the season and the prospects, which are based on good crop conditions, are considered good. In the Milwaukee market there is a somewhat better tone with a notably better call for heavy machine tools and power equipment. Texas has a good demand for pumping machinery as well as for equipment for cotton gins and manufacturing plants.

New York

NEW YORK, July 30, 1913.

In the last week or ten days business has fallen off considerably in this market and the trade is disappointed in view of the fact that in the first half of the month activity was fair. Not only sales, but inquiries as well as few. Representatives of the trade are at present asking many questions as to what others think of the outlook. Conditions are described as "drifting" and "colorless" and the general view is that no great betterment will come along until September. A comment much heard is that there should be an early settlement of the tariff question regardless of its minor provisions. Other questions for which early settlements are hoped are those involving railroad freight rates and wages. The railroads are doing very little buying and are not expected to do more while the negotiations as to trainmen's wages are pending. Sales of one or two machine tools are being made to manufacturers here and there and the only list out is one from the Navy Department at Washington for tools and equipment for Washington, Brooklyn and the Norfolk navy yards. The list follows:

- One 5-ton crane for Washington, D. C., schedule 5676.
- Two 26-in. upright sliding head drills for Norfolk, Va., schedule 5677.
- One 21-in. vertical drill, for Brooklyn, schedule 5678.
- Two vertical 5 hp. steam engines, for Norfolk, schedule 5677.
- One vertical 6x6 steam engine for Brooklyn, schedule 5678.
- One double-wheel square case emery grinder for Brooklyn, schedule 5678.
- Two belt-driven screw cutting back-gear heavy duty engine lathes for Norfolk, schedule 5677.
- One 28-in. screw cutting engine lathe for Brooklyn, schedule 5678.
- One 14 in. tool room lathe for Brooklyn, schedule 5678.
- Two complete tool grinding machines for Norfolk, schedule 5677.
- One 15 in. column tool room shaper for Brooklyn, schedule 5678.
- Two 16 in. complete back-gear crank shapers for Norfolk, schedule 5677.

Plans have been completed for the new factory which the Whitehead & Hoag Company, Newark, N. J., is to erect at Sussex avenue and First street, that city. The building will be of steel and reinforced concrete, five stories, 65 ft. in width and built in the form of an L with a power plant in the rear. It will stand on a plot 150 x 240 ft. The building was designed by Monks & Johnson, architects, of Boston, and the contractor is the Fred T. Ley Company, Springfield, Mass. It is to be modern in every respect and include rooms for the rest and recreation of the employees. The factory now occupied by the Whitehead & Hoag Company has been purchased by the Benjamin A. Johnson Company which is to occupy it as a factory.

Arrangements have been made whereby Manning, Maxwell & Moore, Inc., 85 Liberty street, New York, will have the exclusive sales agency in the United States of the electric riveters manufactured by the Eveland Engineering & Mfg. Company, Philadelphia, Pa. It is announced that the Eveland Company is extending its facilities and will manufacture transformers and electric tempering and hardening machines.

A large factory for the manufacture of cabinets is

to be erected by the Vitaphone Company of New York City on a three-acre site recently purchased at Newburgh, N. Y.

The Bell Locomotive Works, Inc., Yonkers, N. Y., has filed incorporation papers, with a capital stock of \$20,000, and will establish a manufacturing plant. H. W. and J. Harvey Bell, 301 Palisade avenue, and F. W. G. Bellair, 5 Pine street, Yonkers, are the incorporators.

The F. K. Brewster Company, Port Ewen, N. Y., manufacturer of electric fuses, blasting caps, etc., is arranging to erect a factory on a site recently purchased.

Plans have been completed for an additional factory to be erected at the plant of the Oneida Steel Pulley Company, Oneida, N. Y.

The Gurney Ball Bearing Company, Jamestown, N. Y., which now manufactures goods for the automobile trade, expects to add a line of shaft hangers next year.

The Augustine Rotary Engine Company, Buffalo, N. Y., contemplates building a plant in Toronto, but has not yet made final decision.

Philadelphia

PHILADELPHIA, Pa., July 28, 1913.

While no appreciable gain has been made in the total volume of business, the recent improvement reported by some sellers appears to have been maintained. On the whole, business continues irregular, in that some manufacturers, as well as merchants, still find the demand quiet. A trifle better movement in purchases by railroads is reported, although orders have been largely confined to single tool purchases. Important inquiries covering any material number of tools or general plant equipment are still lacking, new projects moving with extreme slowness. The demand for small and medium power equipment, with an occasional large installation, keeps builders fairly active. Foreign demand for machine tool equipment has been light. Second-hand machinery drags, reflecting conditions in the general market. Steel casting plants report a somewhat lighter demand, but gray-iron foundries continue fairly well engaged.

Construction work has been started on the 12-story concrete warehouse and storage building for the Larkin Company at Twenty-second and Arch streets. Ballinger & Perrot are the engineers and the Aberthaw Construction Company has the general contract. The building will be 136 x 166 ft. Three passenger and two freight elevators will be installed. Details as to the power equipment are not available.

Ballinger & Perrot, engineers, have plans in progress for a one and two-story brick repair shop and garage for the Department of Public Safety, to be erected at Eleventh and Reed streets. The building will be 40 x 100 ft.

Bids are being taken by the United Gas Improvement Company for the erection of a one-story brick and steel garage, 52 x 70 ft., to be erected at Forty-seventh and Market streets. William J. Serrell is the engineer.

The John A. Roebling's Sons Company, Trenton,

N. J., is building an addition, one story, 80 x 140 ft., to its Hudson Street annealing house, for which no mechanical equipment will be required.

Plans have been prepared by Herring & Gregory, engineers, New York City, for a sewage clarification plant, to be erected for the city of Trenton, N. J., to cost about \$200,000. It is stated that bids will be asked in the near future.

The Pottsville Foundry & Stove Company, Pottsville, Pa., has been organized and will operate the Derr foundry in that city, the oldest foundry in Schuylkill County. The company manufactures gray-iron castings as well as the Derr line of furnaces, heaters and ranges, S. F. Laucks, president of the York Safe & Lock Company, York, Pa., is president; H. J. Williams is manager and advises that no immediate improvements to the plant will be made, although additions are contemplated at a later date.

John A. Walls, engineer, Baltimore, Md., is preparing plans for extensive alterations and additions to the plant of the Pennsylvania Water & Light Company at Holtwood, Pa. Details are not yet available.

Chicago

CHICAGO, ILL., July 28, 1913.

Following a period of about 60 days in which machinery sales were very light the last week or two has shown sufficient improvement to be quite generally the subject of comment. With the exception of an attractive list of tools for which the Charles City Engine Works, Charles City, Iowa, is asking prices, the new business is of the scattering variety, orders being for a few tools at a time. Machine tool builders are also finding the situation better for the release of considerable machinery, the shipment of which had been held up. Railroad buying is not important, but some of the proposed shop extensions offer promise of fall business and some lists are understood to be in preparation. The machines for which the Charles City inquiry calls include the following:

- Three 16-in. lathes.
- One 28-in. lathe.
- One 2½-in. turret lathe.
- Two 16-in. shapers.
- Two 4-ft. radial drills.
- One milling machine.
- One 40-in. planer.
- One 52-in. boring mill.
- One keyseater.
- One tool grinder.
- One gear hobber.
- One 20-in. vertical drill press.
- One 30-in. vertical drill press.
- One power hack saw.
- Two oil furnaces for tool room.
- One babbitt melting furnace.

The Chicago Carriage & Trimming Company, 1908 Indiana avenue, Chicago, has acquired the property at 3514-3520 South Michigan avenue and will build a four-story brick structure to cost about \$85,000.

E. Biegler, Chicago, has had plans prepared for a two-story factory 30 x 40 ft. to be erected on South Rockwell street at a cost of \$7,000.

The Woodbridge Ornamental Iron Company, Chicago, has been incorporated with an authorized capital stock of \$10,000 by Arthur L. Woodbridge of 1228 Peterson street, Chicago; Frederick Moe and William J. Bell.

The glucose plant of the Corn Products Company, at Waukegan, Ill., has been closed and the machinery is being taken to other locations.

The city of Manito, Ill., has authorized the issuance of bonds amounting to \$6500 for a new electric light plant.

The capital stock of the Hayes Pump & Planter Company, Galva, Ill., has been increased from \$200,000 to \$750,000 for the purpose of extending capacity and operations.

The American Shoe Stock Company, Centralia, Ill., has let the contract for the erection of a new factory building 50 x 100 ft. to cost \$10,000.

The Joliet Warehouse & Transfer Company, Joliet, Ill., is planning the erection of a new warehouse 70 x 300 ft., three stories, to be located on the property of the Chicago & Alton Railway Company.

The Moore Mfg. Company, Waterloo, Iowa, has been incorporated with a capital stock of \$10,000 by E. L. Moore, U. G. Kramer and W. M. Hogan. The company will manufacture sheet metal goods.

The Anderson Automatic Engine Company, Davenport, Iowa, has purchased the old Killing molding machine plant and will manufacture gasoline engines and motor section cars. C. C. Anderson, president of

the company, is in Chicago purchasing new machines and tools.

O. H. Olson, Stillwater, Minn., has been awarded the contract for the erection of the new harvester plant for the state prison at Stillwater, to include machine shop, foundry and warehouse. The contract provides for an expenditure of \$215,000.

The Link-Belt Company, Indianapolis, Ind., is erecting a new factory at Addison and Belmont streets at a cost of \$30,000.

The Lamb Boat & Engine Company, Clinton, Iowa, formerly a part of the J. D. Lamb estate, has been purchased outright by the Lamb Engine Company, recently incorporated, which will continue the business along the same lines. Officers of the new company are as follows: President, J. J. Corkill, also president of J. J. Corkill & Co., Chicago, Ill., bankers and boat brokers; vice-president, G. E. Lamb, Clinton, Iowa, president of the Lamb-Fish Lumber Company; treasurer, J. J. Corkill; secretary, E. C. Glenny, Chicago, secretary of the Fort Dearborn Trust & Savings Bank; general manager, F. B. King, Clinton, Iowa. The capital stock is \$50,000. It is the intention to develop the old line of engines and get out new models of the larger sizes, catering to the better class of trade as heretofore and building strictly high-grade marine gasoline engines. The new company will increase the capacity of the plant as rapidly as it becomes necessary. The general sales branch for Eastern territory will be at room 612, 30 Church street, New York.

Milwaukee

MILWAUKEE, WIS., July 28, 1913.

As August approaches a somewhat better tone seems to develop in the machinery trade in this district, although the revival after the usual midsummer slackness is not due until the last of August or the middle of September. A gratifying feature of the situation is the improvement noted in heavy machinery and power equipment, which have suffered most from the conservatism underlying general trade. While no orders are recorded some good inquiries have been put out. The tool builders are still well employed, while automobile and parts makers are rushed to the limit of capacity to make deliveries, incidentally furnishing some good, though small, business for the tool-makers. Pay-rolls are increasing as the usual midsummer lay-offs terminate.

The Chicago, Milwaukee & St. Paul Railway Company has requested the Wisconsin Railway Commission for another extension of time to complete its track elevation on the South Side, Milwaukee, intimating that the tightness of the money market makes this necessary. The commission some time ago declared that no further delay would be permitted. The elevation project involves several million dollars.

The Wisconsin Farm Implement Company, South Beloit, Wis., has moved into its new shop building and is increasing its output of small and large grinders and farm tools. The P. F. Moak Foundry Company is supplying all castings for this and several other Beloit industries.

The Simmons Mfg. Company, Kenosha, Wis., has settled the strike of its molders by allowing a slight increase in wages. About 350 men were involved.

Plans are being made for a shop building for the Sterling Mfg. Company, Racine, Wis., recently incorporated with \$10,000 capital to manufacture metal specialties. Permanent organization has been effected and negotiations for a site which will permit of future expansion are under way. C. C. Gittings is president and L. J. Powell is secretary.

The Killen-Walsh Mfg. Company, Appleton, Wis., has started work on the initial lot of 25 seven-ton gas tractors and is adding men daily. The company occupies the entire plant formerly used by the Double Power Wind Mill Company, and is buying some little equipment as needed. The motors for the tractors are built by the Waukesha Motor Company, Waukesha, Wis.

The Littand Mfg. Company, Kenosha, has increased its capital stock from \$25,000 to \$40,000 to provide for enlargement of its business.

The C. H. Driver & Kerr Company, organized at Racine with \$25,000 capital stock, succeeds to the business of the Driver Mfg. Company, sand-paper and woodworking machinery manufacturer, and is now engaged in adding several new lines of devices to its production. The Driver plant will be enlarged, although no large investment is contemplated at this time.

Plans for active production are being made by the Royal Ice Machine Company, Grand Rapids, Wis., which was organized several weeks ago and has just completed its formal organization by the election of J. A. Cohen as president and G. W. Paulson as secretary-treasurer. The company is capitalized at \$25,000. It will manufacture and market small refrigerating machines designed by George F. Krieger of Grand Rapids. The machines are designed for installation in meat markets, grocery stores, and other places where large installations are impossible or prohibitive because of price. A factory will be erected as soon as possible and a site is now being selected.

E. Q. Nye, referee in bankruptcy, Milwaukee, has ordered the Wisconsin Trust Company, trustee of the bankrupt estate of the Wisconsin Engine Company, of Collins, Racine County, to sell the real and personal property of the company on August 18 at Corliss. The real estate consists of 200 acres. The shop buildings are nearly new and splendidly equipped for engine and machinery production.

Wheeling

WHEELING, W. VA., July 28, 1913.

The Charleston Window Glass Company, Charleston, W. Va., is rebuilding the part of its plant recently destroyed by fire. The new building will be 164 x 180 ft., and will be completed by September 1.

It is reported the Huntington Tumbler Company, Huntington, W. Va., will enlarge its plant so as to double its capacity.

The D. H. Gowing Veneer Company has been organized at Burnsville, W. Va., for the purpose of establishing a rotary veneer mill. N. Howard Gowing and others are interested. The company has \$50,000 capital stock.

The Webster Springs Power Company, Webster Springs, W. Va., has been organized with \$50,000 capital stock to develop a power project. C. L. Benedict, J. W. White and E. R. Randolph are interested.

The Wakefield Coal Co., Wheeling, W. Va., has been incorporated with \$20,000 capital stock by George M. Caldwell, Ross G. Caldwell, of Columbus, Ind.; Charles T. Caldwell, G. W. Leive and William Lucas, of Wheeling.

The Newell Bridge & Railroad Company, Newell, W. Va., has been incorporated with \$500,000 capital stock by Sterling Newell, Donald McBride, C. C. Owens, Ellis R. Diehm and Harold T. Clark, all of Cleveland, Ohio.

The W. W. McDonald Company, Logan, W. Va., has been incorporated with \$400,000 capital stock to develop coal and timber lands by Willard McDonald, of Mann, W. Va., and Brue Bolton, S. E. McDonald and M. Alice Robinson, of Cambria, Va.

The Kentucky River Hardwood Company, Charleston, W. Va., has been incorporated with \$500,000 capital stock by S. M. Croft, Huntington, W. Va.; Samuel Stephenson, A. B. Koontz, Forsythe Stephenson and C. Sayre, of Charleston, W. Va.

The Nahawka Lumber Company, Charleston, W. Va., has been incorporated with \$25,000 capital stock by G. C. Rippetoe, T. C. Davis, J. Wilcox Adams, W. L. Rippetoe and Jo. N. Kenna, of Charleston, W. Va. The company is authorized to build hydraulic and other plants for the manufacture of electricity, and to mine and manufacture coal and coke and their by-products.

The Weimer Packing Company, Wheeling, W. Va., has been incorporated with \$25,000 capital stock by William C. Weimer, Henry C. Weimer, William Fette, E. Morris and Ed F. Horstman, of Wheeling, W. Va.

Cincinnati

CINCINNATI, OHIO, July 28, 1913.

The molders' strike has not yet been settled, and both sides to the controversy are simply playing a waiting game. Already one large machine tool plant has been forced to close down for the want of castings, and it is understood that others will follow within a few days. However, as midsummer is a dull period with machine tool builders and other manufacturers, these shutdowns will not work any appreciable hardship. There are sufficient stocks of standard tools to take care of present needs, and the breathing spell will not be unwelcome to many. The latest local strike was declared by the teamsters, who are demanding increases that will average about 20 per cent. above the present schedule. This trouble is causing some incon-

venience to a number of manufacturers, but is not seriously affecting any in the metal working lines.

The Dayton Oxygen & Hydrogen Products Company, Dayton, Ohio, has been incorporated with \$35,000 capital stock, and has established a plant in South Dayton, which is now in operation. The incorporators are C. A. Kurz, Jr., C. W. Fricke, George Walther, A. L. Kurz and J. A. Wortman.

The Springfield Spring Company, Springfield, Ohio, has purchased the hardware specialty department of the Urbana Specialty Company, Urbana, Ohio, and will move that part of the factory to Springfield.

The John Wild Evaporated Milk Company, Marysville, Ohio, will erect a large milk canning plant at Ridgeway, Ohio, for which special equipment will be required.

The South Park Sewer Pipe & Tile Company, South Park, Ohio, has been incorporated and will erect a plant at an early date. Ernest Finch is named as one of the principal incorporators.

Plans are on foot for adding a foundry building to the plant of the Ohio Penitentiary, at Columbus, Ohio. No details are yet available.

The Carman Mfg. Company and the Columbus Tinware Company, Columbus, Ohio, have consolidated, and will be known as the Carman Mfg. Company. The new company has been incorporated with \$50,000 capital stock, and will make some large additions to its plant on West Goodale street.

The Cincinnati Vending Machine Company, Cincinnati, has been incorporated with \$25,000 capital stock to manufacture vending machines and other specialties. No manufacturing plans have yet been given out. B. A. Tackett and C. T. Ryan are among the incorporators named.

The large lumber plant of the Hanna Lumber Company, Cincinnati, was destroyed by fire July 26. It is understood that as soon as insurance adjustments are made the rebuilding plans will be drawn up.

The Richland Mfg. Company, Mansfield, Ohio, has been incorporated with \$100,000 capital stock, to manufacture cranes, shovels and special machinery. E. R. Diehm and C. C. Owens are named among the incorporators.

The National Steel Pulley Company, Maysville, Ky., has been incorporated with \$30,000 capital stock, by W. R. Patten and others.

Cleveland

CLEVELAND, OHIO, July 29, 1913.

The market is not active. Few new inquiries have come out, and during the past few days machinery merchants have been working largely on old deals. Sales are scattering and almost entirely in single tools. During the week orders were placed for a number of gear-hobbing machines by makers of automatic transmission machines. In the aggregate July business with dealers appears to have been about the same in volume as during June. Some dealers report an improvement in orders and others are falling off during the month as compared with June. The trade does not look for much improvement before the vacation season is over. Makers of automatic screw machines report a good foreign demand, but domestic demand is not active. The demand for second-hand machinery is dull.

The Lake Shore & Michigan Southern Railroad is in the market for the following woodworking equipment for its new car repair shops at Air Line Junction, near Toledo, Ohio:

- One gaining machine.
- One bandsaw.
- One rip saw.
- One cut-off saw.
- One combined gaining and boring machine.
- One large vertical boring machine.
- Two heavy vertical mortising machines.
- One tenoning machine.
- One bandsaw filer.
- One knife grinder.
- One hollow chisel grinder.
- One double emery wheel.

The company will also purchase the following metal-working equipment for its car repair shops:

- Five drill pressers.
- Two bolt cutters.
- One triple head bolt cutter.
- One shaper.
- One twist drill grinder.
- Two double emery wheels.

A number of machine tools will be purchased by the railroad for its machine shop to be erected in connection with a new engine house at the same point. This list has not yet been prepared.

The American Sherardizing Company, Cleveland, has been incorporated with a capital stock of \$10,000 by

John S. Campbell, A. W. West, W. H. Dornback and others.

The Trio Mfg. Company, Cleveland, has changed its name to the Cleveland Metal Craft Company.

The Baehr Mfg. Company, Cleveland, has been incorporated with a capital stock of \$10,000 to manufacture a pipe and boiler cleaning device and a boiler compound. Among the incorporators are H. R. Gall, A. C. Teare, Floyd E. Waite.

The Richland Mfg. Company, Mansfield, Ohio, has been incorporated with a capital stock of \$100,000 to manufacture cranes, shovels and machinery. The incorporators are E. R. Diehm, C. C. Owens, F. T. Clark, M. T. Kirby and D. McBride.

The Lake Shore Railroad has had plans prepared for the first unit of its new car repair shops at Ashtabula, Ohio, for which the contract will probably be placed shortly. The building will be 200 x 450 ft.

The Weller Meter Company, Elyria, Ohio, has been incorporated with a capitalization of \$10,000 by G. L. Weller, W. G. Sharp and others to manufacture water meters.

The City Council of Alliance, Ohio, is planning an expenditure of \$9500 for a waterworks pumping engine.

The plant of the Warren Mfg. Company, Warren, Ohio, maker of chairs, was almost totally destroyed by fire July 22. The plant included a planing mill and a great deal of woodworking machinery.

The Central South

LOUISVILLE, KY., July 28, 1913.

Business has been holding up well the past week, the improved demand recently noted having continued. Machinery manufacturers and dealers, while not looking for as heavy a business as was experienced in the spring and will be in order a month or so later, are satisfied with developments, reporting a good demand for most of the leading lines handled in this market. Boiler manufacturers have much work on hand, and are running their shops overtime. Motor manufacturers report that while the demand for electrical equipment generally is fairly quiet, the call for motor-driven machine tools, direct connected, is remarkably good. The machine tool business in this territory has been unusually good this summer. Not only are numerous automobile repair shops, which have been started all over the state, calling for their complement of machine tools, but additional metal-working industries and machine shops for general repair purposes have been established, all making for improved machine business.

The American Boiler Works, 524 East Main street, Louisville, which has confined its attention to boilers, tanks and structural work, is establishing a machine shop in which general repair work will be handled. The concern has purchased a 20-hp. motor from the James Clark, Jr., Electric Company; a 24 in. x 26 ft. Porter lathe; a heavy duty lathe, 18 in. x 10 ft., from the R. K. LeBlond Machine Tool Company, Cincinnati; a 4-ft. radial drill from the Fosdick Drill Company, Cincinnati, and other equipment. The business is to be incorporated, according to an announcement of C. H. Gerrard, head of the firm.

E. G. Duckwall & Co., Louisville, have begun the construction of a grain elevator at Twentieth and Howard streets. The concern will be in the market for conveyors and other grain-handling equipment, as well as motors.

Eberts & Bros., Thirteenth and Lexington streets, Louisville, will shortly be in the market for automatic packing machinery for handling flour in cartons. Many flour millers in this section have begun to use paper boxes instead of sacks for handling flour in small packages.

The Puritan Cordage Mills, Louisville, has decided on the enlargement of its plant, and will increase its capacity 25 per cent. Braiders and other special equipment will be added in the various departments. It is planned to make the improvements about October 1. No additions to the power equipment are planned. Charles T. Wolfe is president.

An item in *The Iron Age* of July 17 referring to the proposed establishment of a factory at Anderson, Ind., by the Travelers' Insurance Machine Company was somewhat in error. The company, which has its offices in Louisville, has contracted with the Insurance Machine Sales Company, Anderson, Ind., for the manufacture and distribution of the automatic vending devices which it controls. The Insurance Machine Sales Company is said to be backed by the Liberal Life Insurance Company and the Loyal Order of Moose, both

of which have headquarters in Anderson. The Travelers' Insurance Company, of which Ernest L. Baker is general manager, has the erection of a factory in view.

Louisville manufacturers, including machinery houses, are much interested in plans for a "Louisville Made" week, to be held the latter part of August, when products of local factories will be displayed in the downtown shop windows. Retailers also have extended their co-operation in exploiting home products.

The plant of the Cloverport Foundry & Machine Company, Cloverport, Ky., was destroyed by fire July 23, the loss being \$7000. The company is now considering plans for rebuilding.

The Illinois Central Railroad Company, with general offices in Chicago, is reported to be considering plans for the enlargement of its shops at Paducah, Ky.

An automobile repair shop will be equipped by the Collins-Morton Company, Flemingsburg, Ky., which has taken over the business of the Collins-Crain Company. The machinery will be purchased at once.

The Hazard Steam Laundry Company is being organized at Hazard, Ky., for the establishment of a large laundry.

The Mineral Fuel Company, which is developing a large tract of coal land in eastern Kentucky, reports that a brick-making plant with a capacity of 5000 brick a day will be established at Fleming, the industrial city being built by the company. Saw and planing mills also will be built. The company's offices are in Philadelphia.

The Davis Hosiery Mill Company, Chattanooga, Tenn., which has purchased the hosiery mill of R. C. Aycock at South Pittsburg, Tenn., plans the enlargement of the plant and the installation of a large amount of special equipment.

The Southern Aseptic Cotton Company, Chattanooga, Tenn., plans to double the capacity of its plant and install a bleachery for bleaching and dyeing work. The cost of the improvements will be \$200,000.

The Chattanooga Cold Storage & Warehouse Company, Chattanooga, Tenn., has begun the construction of an addition to its plant to cost \$85,000.

The Memphis Cotton Mfg. Company, Memphis, Tenn., will erect a plant for the manufacture of absorbent cotton, with a capacity of 2000 pounds a day. The cost of the plant is estimated at \$75,000. J. H. Hines may be addressed.

The Elizabethton Water Company, Elizabethton, Tenn., is considering plans for the construction of a water system at Maryville, Tenn. Address M. R. Hunter.

The Carruthers-Jones Shoe Company, St. Louis, Mo., is reported to be considering plans for the establishment of a branch factory at Memphis, Tenn.

The Morgan-Butler Company, Maryville, Tenn., is reported to have plans for the erection of a large saw-mill.

Frank Beuel and Frank Newell, Bay City, Mich., are reported to be considering the establishment of a plant at Nashville, Tenn., for the manufacture of automobile bodies.

The Dayton Hosiery Mills, Dayton, Tenn., which was recently organized with \$60,000 capital stock, will establish a plant. A. B. Andrews, Chattanooga, Tenn., is among those interested.

The Memphis Market Gardeners' Canning Company, Memphis, Tenn., has been organized to establish a canning plant. J. L. Ullathorne is president of the company.

Huntingdon, Tenn., will spend \$5000 in improving its electric light and water plants, bonds of this amount having recently been authorized.

The South Pittsburg Water Company, South Pittsburg, Tenn., has announced that the plant will be improved at the expenditure of several thousand dollars.

The Fletcher Mfg. Company has been organized at Nashville, Tenn., and will establish a furniture factory. It will make lawn, porch and mission furniture. E. H. Fletcher is head of the concern. The factory building will be 40 x 100 ft.

The Memphis Consolidated Gas & Electric Company, Memphis, Tenn., will dismantle its old plant and practically install a new plant at Kansas street and McLemore avenue. About \$200,000 will be expended.

The Shell Chair Company, North Wilkesboro, N. C., has been organized with a capital stock of \$45,000 to manufacture box seat diners and rockers. The company will begin the erection of new buildings within a week. Some of the machinery has been purchased but further orders will be placed. R. W. Gwyn is president; W. A. Shell, vice-president and general manager; J. R. Marlow, secretary and treasurer.

Birmingham

BIRMINGHAM, ALA., July 28, 1913.

The Citronelle Light, Ice & Power Company, Citronelle, Ala., has purchased and remodeled the plant of the Citronelle Planing Mill Company and installed a 100 kw. direct connected generator. The company contemplates the installation of an ice plant between 10 and 20 tons capacity and desires prices and data on electrically driven and steam operated plants.

As the result of the completion of the hydroelectric power plant of the state of Alabama, it is planned to double the capacity of the cotton mill operated by the state with prison labor. Gov. O'Neal, Montgomery, Ala., may have information.

The Export Phosphate Company, Mulberry, Ga., has been incorporated with a capital stock of \$1,500,000, and will mine phosphate near that place.

J. G. McGowin and W. E. Fishee, Pensacola, Fla., have purchased 52,000 acres of timber land near Brewton, Ala., and will establish a large sawmill.

H. L. King is erecting a grist mill and ginnery at James, Ala.

The St. Andrews Bay Company, Callaway, Fla., has purchased 100,000 acres of timber land and will erect a pulp and paper plant, also a sawmill with a capacity of 250,000 ft. It will install machinery for extracting products from roots, stumps, etc. Fleishell & Carpenter, operators of a number of sawmills in Louisiana and Mississippi, are the principal stockholders.

John Engel & Son, El Paso, will establish a sand brick plant at Miami, Fla.

The Hillsborough Brick Company, Tampa, Fla., has been incorporated with a capital stock of \$150,000 and will establish a plant near Mango, Fla. Burnett F. Stevenson, of Detroit, Mich., is president. Carl G. Trebein, Detroit, and Carl S. Johnson, Toledo, Ohio, are also interested.

The Orlando Water & Light Company, Orlando, Fla., will increase the capacity of its ice plant from 20 to 60 tons per day.

A company with \$10,000 capital stock has been organized at Quitman, Ga., to manufacture a molding machine. W. W. McCarter, H. F. Lilly, D. G. Malloy, and Quitman, are interested.

The Universal Ice Company, Savannah, Ga., has completed its organization and proposes to erect a factory. T. B. Floyd, A. J. MacArthur, F. W. Edwards and F. B. Ferguson are interested.

The Alabama Chemical Company, Montgomery, is preparing to erect a fertilizer factory at Dawson, Ga., with a capacity of 25,000 tons per season.

W. H. Sawyer & Sons contemplate installing a foundry at their iron plant at Americus, Ga.

The Muscogee Light & Power Company, Columbus, Ga., has been organized with an initial capital stock of \$50,000. A plant is to be erected. J. P. Ilges and T. E. Golden are the incorporators.

St. Louis

ST. LOUIS, MO., July 28, 1913.

With continued good prospects and a fairly satisfactory run of business for the season, the machine tool dealers take a cheerful view of the future. Second-hand tools are in some demand. The general run of business being done is on single tool orders and replacement work.

The plant of the St. Louis Surfacers & Paint Company, St. Louis, manufacturer of liquid protectors of metals, etc., was burned July 21, with a loss of \$65,000. The manufacturing equipment, which was large, will be replaced as soon as arrangements can be made. W. S. and H. C. Avis, A. R. Deacon and M. L. J. Lambert are interested.

The N. O. Nelson Mfg. Company, St. Louis, maker of plumbers' supplies, etc., announces the purchase of the plant of the Union Sanitary Mfg. Company, Noblesville, Ind., producer of enameled iron annually to the amount of about \$500,000. The new plant will be overhauled.

The St. Louis Edible Nut Company, St. Louis, whose plant was burned recently with a loss of about \$50,000, will replace the destroyed equipment, etc., at once.

The I. X. L. Insu-Metallic Products Company, St. Louis, has been incorporated with a capital stock of \$100,000 by H. F. Vogel, A. Von Hoffman, C. B. Adams, Oliver J. Miller and John Grewe to manufacture non-conductive building material.

The Fulton Bag & Cotton Mills, St. Louis, manufacturer of cotton bags, etc., has completed the purchase

of the site recently reported as contemplated and will proceed as rapidly as possible with the construction and equipment of a new plant to cost about \$300,000.

The Waterproofing Company, St. Louis, has been incorporated with a capital stock of \$13,000, by Alfred H. Annan, Ben J. Many, Charles N. Jacobs and Philip Seibel to equip a plant for the manufacture of waterproof building material.

The Valco Mfg. Company, St. Louis, whose incorporation with a capital stock of \$15,000 was recently announced, will equip a plant for the manufacture of machinery, tools, etc., at once. Those interested include Harry A. Adams, James L. Hopkins, Frank J. Bonskowski and others.

The Busy Bee Candy Company, 417 North Seventh street, St. Louis, has plans for the expenditure of about \$5,000 in the extension of the mechanical equipment of its plant.

The Plows Candy Company, St. Louis, which has been reorganized with A. F. Johnson as president, following receivership proceedings, will enlarge its manufacturing plant at 304 Elm street.

The American Leatherboard Company, East St. Louis, Ill., has been incorporated with a capital stock of \$125,000, by William W. Alexander, A. A. Hunt and H. B. Gardner and will equip a plant for the manufacture of leather board, etc.

The Missouri Engine Company, St. Louis, will erect a two-story factory costing \$4500 at 2804 North Eleventh street.

The City Steam Laundry Company, Excelsior Springs, Mo., has been incorporated with a capital stock of \$10,000 by A. G. Arnold, A. D. Black and N. M. Black and will equip a steam laundry plant.

The City Boiler & Machine Company, Kansas City, Mo., has been incorporated with a capital stock of \$17,500, by G. P., J. J. and N. B. Snyder to equip a boiler and machinery repair plant.

The Ennis-Cutler Lumber Company, Springfield, Mo., has been incorporated with a capital stock of \$20,000, by E. E. Ennis, S. L. Cutler and A. W. Lincoln.

The Irrigating Cultivator & Pump Company, Mount Washington, Mo., has been incorporated with a capital stock of \$40,000 by Arch. Douthitt, E. F. Douglass and Lee H. Erskine to manufacture irrigation and cultivating machinery.

The Briquette Coal Mfg. Company, St. Louis, has increased its capital stock from \$100,000 to \$160,000 for the purpose of extending its equipment.

The city of Joplin, Mo., voted July 22 a bond issue of \$75,000 to increase and improve the equipment of its electric light plant.

The Hein Specialty Company, St. Joseph, Mo., has increased its capital stock from \$10,000 to \$30,000 for the purpose of extending its mechanical equipment.

The State Capitol Commission of Missouri will open bids at Jefferson City, Mo., August 14 for the equipment for a power plant for the new capitol.

A bond issue of \$10,000 has been voted by the city of Marcelline, Mo., for the equipment of a municipal electric light plant.

A garage, repair shop and clubhouse to cost about \$30,000 will be equipped for the Automobile Club of Kansas City, with Thomas W. Sanborn as engineer and architect in charge.

The Kansas City Stock Yards Company, Kansas City, Mo., is reported to have plans for the expenditure of about \$1,000,000 in improvements, much of which will be for mechanical equipment.

The Wrenn Broom Mfg. Company, Joplin, Mo., recently incorporated by J. W. and S. E. Wrenn and others will equip a plant for the manufacture of about 100 dozen brooms daily at first and will enlarge later.

The Kentark Land & Lumber Company, controlled by capitalists of Louisville, Ky., has acquired about 25,000 acres of land in the vicinity of Pine Bluff, Ark., and will erect a large hardwood lumber mill.

The Spring Bank Lumber Company, has been incorporated with a capital stock of \$150,000 by H. M. McIver, of Texarkana, Ark., and E. W. Hamiter, of Shreveport, La., and will build a large mill at Spring Bank, near Doddridge, Ark.

A planing mill of considerable capacity will be equipped at Van Buren, Ark., by R. Bennett.

The Kerosene Carburetor Company has been incorporated with a capital stock of \$12,000 at Little Rock, Ark., by Walter G. Addison, W. F. Garnett and W. H. Garnett to manufacture carburetors for motors.

The veneer mill to be erected by Roberts & Conner, of New Albany, Ind., at Searcy, Ark., will require an 8-ft. band saw, veneer rotary machine and power equipment.

F. Bourland has plans for the installation of a re-

frigerating plant and a two-ton ice machine at Fort Smith, Ark.

A street railroad, with power house equipment, etc., is planned for Mount Pleasant, Ark., by G. H. Rider, who has a franchise.

The glass plant of the Alexander H. Kerr & Co., of Altoona, Kan., is to be removed to Sand Springs, near Tulsa, Okla., and considerably enlarged, it is reported.

The Pawhuska & Northeastern Railroad, with headquarters at Pawhuska, Okla., is preparing for construction work and is reported in the market for second-hand locomotives, etc.

The Rainor Gin Company, Grandfield, Okla., has been incorporated with a capital stock of \$15,000 by Sam Williams, O. A. Miller, and Amos Williams of Elk City, Okla., and T. H. Rainor, of Grandfield, and will equip a cotton ginnery.

The Farmers' Gin Company, Eakley, Okla., has been incorporated with a capital stock of \$7,200 by J. B. Shannon, J. C. Sheets and W. A. Rolan and will equip a cotton ginnery.

The Wetumka Gin Company, Wetumka, Okla., recently reported incorporated by George Appling, H. M. Brazill, E. D. Hall and J. F. Lucas, will install machinery to cost about \$6,000.

The Muskogee Vehicle & Machinery Company, Muskogee, Okla., has been incorporated with a capital stock of \$10,000 by R. A. Lester, N. Lester and Walter Van Allen to equip a manufacturing plant.

The Stephens County Oil & Development Company, American Bank Building, Oklahoma City, has been incorporated with a capital stock of \$250,000, by W. Frank King and others, and will need machinery for its work, opening bids shortly.

The Big Four Lumber Company, Muskogee, Okla., has been incorporated with a capital stock of \$15,000 by C. M. Sparks, of Hichita, Okla., and Charles L. Reed, of Muskogee, and will equip a mill.

The Oklahoma, New Mexico & Pacific Railroad Company has plans for the equipment of car shops and repair plant at Ardmore, Okla. Address J. D. Hamon, Lenten, Okla., president.

The State of Oklahoma will equip a power plant, laundry, bakery and other mechanical departments at the Institute for the Feeble Minded at Enid, Okla.

The Chickasaw Cotton Oil Company, Houston, Miss., has been incorporated with a capital stock of \$75,000, by L. E. Brevard and A. M. Harley, of Houston, and Robert York, of Memphis, Tenn., and will equip a plant.

The city of Louisville, Miss., is to construct waterworks at an estimated cost of \$30,000. J. E. Baskerville, Birmingham, Ala., is consulting engineer.

The Artesian Farms, Corinth, Miss., is in the market for a considerable quantity of woodworking machinery.

M. L. Fleishel, of the Gulf Lumber Company, and S. J. Carpenter, of the Tremont Lumber Company, both of Fullerton, La., are reported to have plans for the development of about 114,000 acres of timber land in Florida, requiring the expenditure of about \$2,000,000 for a sawmill of 250,000 ft. daily capacity, a paper mill of 200 tons daily capacity, a wood pulp mill, a by-product plant, an electric light and power plant, an ice plant, a cold storage plant, waterworks, etc.

The city of Hammond, La., has decided to sink a deep well and is reported in the market for mechanical equipment and also for a water ram to cost about \$5,000.

Texas

AUSTIN, TEXAS, July 26, 1913.

Dealers report an exceptionally good demand for pumping machinery and equipment for cotton gins and able, although rain is beginning to be needed in the cotton growing belt.

The new municipal waterworks reservoir of Fort Worth, on which nearly \$1,000,000 has already been expended, will be finished by the city under direction of J. C. Lord, superintendent, at an estimated cost of \$300,000. New machinery will be installed to carry on the construction work.

The City Commission of Fort Worth has under consideration the matter of installing a new 3,000,000-gal. pump at the waterworks plant.

The City Commission of Austin will soon let the contract for the construction of about six miles of additional sanitary sewers in South Austin. The sew-

age will be carried across the Colorado River. It will be lifted by an automatic pump.

Kelly, Weber & Co. will erect a large cold storage plant at Lake Charles, La. The company has increased its capital stock from \$50,000 to \$150,000.

The Carmine Oil & Mfg. Company is erecting a cotton-seed oil mill at Carmine.

The board of governors of the Salt River Valley Water Users' Association has let the contract for the construction of the new electric power station at Holbrook-in-the-Rock, Ariz., to Marin & Gallis, of Phoenix.

The United Fuel & Power Company, Wichita Falls, has been organized, with a capital stock of \$500,000. The incorporators are J. W. Dyson, Andrew Urie and C. E. Menzie.

The Consumers' Ice Company will erect an ice plant at Beaumont. G. W. Newman is interested.

George Hahn, of Seguin, is erecting a cotton gin at Hamiltonburg.

An election of tax-payers of Corpus Christi will be held August 6 to vote on the proposition of issuing \$20,000 bonds for the erection of a garbage disposal plant.

The Pleasanton Electric Light & Power Company is erecting an electric light plant at Pleasanton.

Shanks & Eagle will erect a garage and machine shop at Smithville.

J. H. Lester is erecting a cotton gin at Johnson City.

Eastern Canada

TORONTO, July 26, 1913.

The Canadian Pacific Railway Company has taken out a building permit for another addition to its coach repair department at the West Toronto shops. It will be one story, brick, with a concrete foundation specially reinforced to stand the strain of the heavy machinery.

The plant formerly owned by the General Braw Company on Sterling road, Toronto, has been purchased by Cluff Brothers, for \$50,000. The factory will be occupied by a new company which is being formed and which will be known as the Cluff Mfg. Company, to manufacture plumbing supplies.

The Geneva Wall Paper Company's plant at Geneva, Ont., was destroyed by fire, with a loss of about \$100,000. The plant was owned by Fairfax Brothers, who expect to rebuild.

The Brantford Cordage Company, Brantford, Ont., is rebuilding its warehouse which was recently destroyed by fire. A new rope factory may also be built.

The R. Forbes Company, Hespeler, Ont., is making rapid progress in the erection of a large addition to the plant.

The Hot Point Electric Heating Company will build a large manufacturing plant at Toronto, Ont., to cost about \$250,000. Announcement to this effect was made by Willis Booth, president of the company.

The Gramm Motor Truck Company of Canada, Ltd., Walkerville, Ont., manufacturer of Gramm motor trucks, whose factory has been in active operation for the past three years, and which is the largest exclusive manufacturer of motor trucks in the Dominion, has recently completed arrangements to greatly increase its production.

The rate payers of Orillia, Ont., recently carried a by-law to grant the C. N. W. Shoe Company of London, Ont., \$25,000 for 20 years without interest, a free site and fixed assessment. The company agrees to erect and equip a large shoe factory.

The Water Works Commission, Sarnia, Ont., will install steam-driven turbine pumps, for which the contract has been awarded to the Canadian Allis-Chalmers Ltd. The pumps are to be of the Mather & Platt single stage turbine type, each capable of delivering 3,000 gal. per min. against a 200-ft. head.

The Toronto City Council unanimously decided to spend \$1,000,000 for a mechanical filtration plant on Toronto Island.

The General Explosives Company, Montreal, will erect a large plant for the manufacture of dynamite and other explosives near the village of Chelsea, Que.

The Supreme Heating Company, Welland, Ont., will make extensive improvements and additions to cost in the neighborhood of \$10,000. The molding department will be enlarged and a new warehouse erected.

The Electrical Steel & Metals Company, Ltd., will erect a plant at Welland, Ont.

The Spanish River Pulp & Paper Mills have under consideration the erection of a 60-ton sulphite plant at Espanola, Ont.

The Abitibi Pulp & Paper Company, Iroquois Falls, Ont., has let all the contracts in connection with its equipment. The turbines will be supplied by the Holyoke Machine Company, Holyoke, Mass.; the generators by the Canadian Westinghouse Company, Hamilton, Ont., the motors by the Canadian General Electric Company, Toronto and Peterborough, Ont., while the Lackawanna Steel Company, Buffalo, will furnish the structural steel. There will be 18 grinders in the pulp mill, with a capacity of 10 tons a day each.

The H. E. Talbott firm of engineers, McGill Building, Montreal, has taken the contract to complete the plant of the Donnacona Paper Company, near Quebec.

J. H. Sherrard Mfg. Company, Toronto, has been incorporated with a capital stock of \$1,750,000, to manufacture iron and steel.

Western Canada

WINNIPEG, July 26, 1913.

The industrial outlook in western Canada has brightened up considerably on account of the excellent crop situation. The weather has continued favorable for six or seven weeks, and a good average crop is practically assured. Business men generally are confident that money will be in freer circulation this fall, and they are making preparations for a busy season. Machinery houses report a steady demand for various kinds of supplies, although the volume of business is still smaller than at the corresponding time last year. In spite of the drawback of the financial stringency, municipalities are going ahead with improvements in which considerable machinery will be used. It is predicted that the aggregate of trade in the latter half of 1913 will be fully as large as in the corresponding six months of the preceding year.

The Commercial Power, Light & Coal Company, Ltd., Winnipeg, has been incorporated with a capital stock of \$250,000. The incorporators are F. W. Burbridge, R. C. MacPherson and R. M. Kelley.

The Austin Paper Mfg. Company, Winnipeg, has been incorporated with a capital stock of \$150,000. It will manufacture paper of all kinds. The president of the company is R. D. Waugh, ex-mayor of the city. L. N. Austin is the manager and superintendent. The plant will be equipped with machinery for making paper from flax straw and from rags. The capacity planned at present is about six tons daily.

The Hardstone Brick Company, Edmonton, Alberta, will add machinery that will increase the capacity of the plant to 60,000 bricks per day.

The British-American Paint Company, Ltd., Victoria, B. C., is establishing a branch factory at Edmonton, Alberta. Modern paint-mixing and grinding machines will be installed.

The Sherwood Departmental Store Company, Ltd., is building a \$1,000,000 store building in Regina, Sask.

The rate-payers of Esquimalt, B. C., have passed a bylaw to appropriate \$400,000 for installing a sewage system. The clerk is Thomas Sheppard.

Tenders are being received by the City Council of Carlyle, Sask., for a power house, reservoir, pipes, pumping system, steam pump, two boilers, vertical steam engine and the various kinds of equipment required for the installation of an electric light plant. The secretary-treasurer is F. J. Bent, Carlyle, and the consulting engineer is the John Galt Engineering Company, Ltd., Winnipeg.

The Western Canada Shingle Company, Burrard Inlet, Vancouver, B. C., is erecting a new mill, with three machines.

The McElmon Lumber Company is adding a shingle mill to its plant at Serpentine, in the lower Fraser Valley, B. C.

Winnipeg's Industrial Bureau Commissioner states that never has there been greater interest shown in Canada by American manufacturers than in the present year. He has received enquiries from firms manufacturing a large number of different commodities to locate here.

The Everett Pulp & Paper Company, has incorporated in British Columbia as a limited company, with a capital stock of \$672,000. The head office will be in the city of Everett, Wash., while the head office for Canada will be at Vancouver. It is expected that it will erect mills in Canada. The president and treasurer is William Howarth.

New England

BOSTON, MASS., July 29, 1913.

The machinery business is suffering to a considerable extent from the vacation season, but some of the manufacturers report conditions as quite satisfactory, the automobile industry entering largely into the situation. As a rule, however, trade is not what it was in the spring, as might be expected. The manufacturers of small tools are comfortably situated as to orders. The wire manufacturers report the demand for specialties good.

A report, which if true means a great deal in New England, is that the Grand Trunk Railroad is about to resume the building of the line from Palmer, Mass., to Providence, R. I. This link in the railroad system of this territory is considered essentially important, not so much in the opening of new territory as in the increased competition between carriers of freight.

The General Electric Company has awarded the contract for a new building for the works at Pittsfield, Mass., to cost approximately \$350,000. It will be in two sections, one 120 x 380 ft., the other 37 x 380 ft., giving about 60,000 ft. of floor space. The location is on the Boston & Albany tracks and east of buildings 1, 2 and 3. The purpose is to procure space for testing large transformers.

The General Fire Extinguisher Company, Providence, R. I., has completed a 100-ft. extension of its foundry at Auburn, R. I., that will permit of concentrating this branch of the business in the one plant, which would mean the abandonment of the Providence foundry. The new structure is three stories high, corresponding to the arrangement of the original structure. Each of the two upper floors is a homogeneous continuation of existing space, with lines of machinery, the casting floor, the gangways and overhead railways and cranes. The lower floor will be used as a carpenter shop and for the storage of patterns.

The Brown & Sharpe Mfg. Company, Providence, R. I., has taken out a building permit for the erection of an addition 52 x 144 ft., two stories, with foundations designed to sustain additional floors in the future.

The Franklin Electric Mfg. Company, Hartford, Conn., manufacturer of electric lamps, has purchased two large manufacturing buildings located in Middletown, Conn., which were originally built by the Schuyl-er Electric Company, afterward absorbed in the General Electric Company, and later by the Worcester Cycle Mfg. Company and the Leeds & Catlin Company. The Franklin Company plans to consolidate its manufacturing in the newly acquired property, including the present factory in Middletown, which occupies leased quarters, and the plants in Pittsburgh, Pa., and Newark, N. J.

Webster & Briggman, Naugatuck, Conn., manufacturers of cut glass, will erect a factory, 27 x 80 ft., two stories.

The General Mfg. Company, Waterbury, Conn., has awarded the contract for its factory, which will be 33 x 77 ft., two stories.

The Russell Mfg. Company, Greenfield, Mass., has awarded the contract for its factory building, which will be 80 x 125 ft., one story. The company will manufacture taps, dies, screwplates, etc., as has already been stated.

The use of vanadium cast steel locomotive frames by railroads in this country has grown considerably. Statistics compiled by the American Vanadium Company show that the Delaware, Lackawanna & Western, the New York Central and the Southern Railway have had in service for the last five years 1500 vanadium frames. Of these there have been only nine failures, eight of which, it is asserted by the railroads, are not chargeable to the material.

The Joliet Coal Products Company, Joliet, Ill., whose battery of 35 Koppers by-product coke ovens has now been in operation for the greater part of the year, is extending its plant by the addition of 18 similar ovens to cost \$375,000, to be completed by October 1.

An immense electric power plant is to be erected in the bed of the Mohawk River about 700 ft. below the Cohoes Falls, New York, on an acre of land recently granted to the Cohoes Company by New York State. The cost will approximate \$1,100,000.

Trade Publications

Heat Treating Furnaces.—Garrett-Tilley Company, Inc., 90 West street, New York City. Bulletin No. 40. Describes and illustrates the over-fired car type of heat treating furnaces which employ either oil or gas as fuel. One of the special features of the furnace is the maintenance of an accurate temperature, which is accomplished by special designing. A number of views of the furnace, showing the car both inside and outside of the furnace, are included.

Flexible Shafting.—Coates Clipper Mfg. Company, Worcester, Mass. Bulletin No. 24. Illustrates a complete line of flexible shafting for various purposes and the equipment which can be furnished in connection therewith. Among the applications of the flexible shafting which are shown are portable electric drilling and grinding machines, a variable-speed vertical drilling machine, bracket boring machines, surface and center grinding machines, a screw driver and a mechanical hammer. In connection with the engravings of the several applications, data are given regarding the size, weight, power required, etc.

Quick-Acting Lever Vise.—Fisher & Norris, Trenton, N. J. Two circulars. One calls attention to the Fisher quick-acting lever vise, which was illustrated in *The Iron Age*, March 27, 1913, and the other gives instructions for assembling it.

Air Compressors and Hammer Drills.—Sullivan Machinery Company, 122 South Michigan avenue, Chicago, Ill. Two bulletins. No. 58-M pertains to a line of cross compound power-driven air compressors which can be driven by a belt pulley, an electric motor mounted on the crankshaft, or by an impulse water wheel also set on the driving shaft. The capacity of these units varies from 1200 to 3000 cu. ft. of free air per min. for terminal pressures of from 60 to 150 lb. per sq. in. The construction of these compressors is described at length, and there are a number of views of the machines completely assembled and also of their several parts. Bulletin No. 66-M, replacing No. 66-D, describes plug and foot hole and hand-feed hammer drills and stone dressing tools, all of the pneumatic type, in which the cutting bit remains against the stone and is driven by rapid blows on the shank from an independent hammer or piston. A number of views of these tools in use are given, as well as line drawings showing their construction.

Bench Type Grinding Machines.—Ransom Mfg. Company, Oshkosh, Wis. Bulletin No. B-7. Treats of a new line of bench grinding machines, which was illustrated in *The Iron Age*, April 10, 1913. These machines can be furnished with or without steel guards, the guard forming a combination wheel guard and rest. Views of the machines with and without the wheel guard are given, together with a brief table of specifications for the four different sizes which are built.

Fans.—Buffalo Forge Company, Buffalo, N. Y. Booklet. Contains in condensed form data on the dimensions and capacities of Buffalo fans, engines, heaters and other products. It is intended to supplement the company's book on the fan system of heating and ventilating apparatus by giving the dimensions required in the laying out of plans.

Bolt Cutting Machinery.—National Machinery Company, Tiffin, Ohio. Treats of a line of bolt cutting machinery which is built with two, three or four heads and are driven by electric motors. Views of these machines with brief descriptions are given, together with illustrations of the die head and threading operations which have been performed on stock which is not perfectly uniform. An illustrated description of the quadruple head machine appeared in *The Iron Age*, February 3, 1910.

Double-Acting Plunger Pumps.—Goulds Mfg. Company, Seneca Falls, N. Y. Bulletin No. 115. Illustrates and describes a line of horizontal type double-acting plunger pumps which are built in both the outside end and outside center packed styles. The outside end packed pump is designed for high pressure service in connection with mine pumping, municipal water works, oil pipe lines, hydraulic filter presses, etc., while the other style is intended for general water supply, municipal water works and general services where large capacities are required. In making up the bulletin, a view of the pump is given on one page with specifications on the facing one and views of the drive, which can be either by a belt or a direct connected electric or other motor, or by a combination water wheel and electric motor drive, are given on the last page.

Power Hammer.—Fairbanks Company, Broome and Lafayette streets, New York City. Catalogue No. 547. Calls attention to a power hammer for use in carriage factories, car works, edge tool and general jobbing shops. The special features claimed for the hammer are elasticity of the blow, simplicity of construction, ease of adjustment and economy of space. The hammer is made in several different styles, for either belt or motor drive. The different types of special dies which can be furnished are illustrated and also the various parts. Tables of specifications and a schedule of the foundation dimensions are included, with a telegraphic code for ordering the various hammers and their parts. An illustrated description of this hammer appeared in *The Iron Age*, April 10, 1913.

Engine Lathes.—Cincinnati Lathe & Tool Company, Cincinnati, Ohio. Circular. Gives general description and specifications for a line of quick change gear engine lathes which are built in a number of different sizes with three types of headstocks, with single and double back gears. The various features of the lathes, which were illustrated in *The Iron Age*, May 1, 1913, are touched upon, the text being supplemented by numerous halftone engravings.

Manufacturing of Machinery and Machine Parts.—Providence Engineering Works, Providence, R. I. Folder. Refers to the service which this company is prepared to give to manufacturers in solving some manufacturing problems. Among the lines which this firm is prepared to manufacture are all kinds of bearing machinery, spur and bevel gears for automobiles and other machines, internal combustion engines of various types and the machinery and tools required for economical production.

Miscellaneous Machinery.—Standard Machinery Company, 7 Beverly street, Providence, R. I. This catalogue, which is now in its ninth edition, covers a line of wire drawing machinery, rotary swaging machines, rotary shears and other miscellaneous machines applicable to jewelry and miscellaneous trades. In the making up of the catalogue a general description is given of the machines of a certain type, such as wire coilers, draw benches, rotary swaging machines, etc., which is followed in each case by illustrations of the different machines, and in some cases brief supplementary descriptions and tables of specifications.

Duplex Horizontal Drilling Machines.—Garvin Machine Company, Spring and Varick streets, New York City. Circular No. 200. Calls attention to a line of duplex horizontal drilling machines, which are intended for use where work is to be simultaneously machined from opposite directions on the same axis, and describes a number of different types of machines with suitable fixtures for drilling, counterboring, turning or hollow milling. These are made in several sizes with lever, screw, rack and power rack feeds. All of the different machines are illustrated with brief tables of specifications, and special attention is directed to the multiple drill heads which are used on these machines. Illustrated descriptions of some of these machines appeared in *The Iron Age*, May 1 and June 5, 1913.

Belt Treatment.—Cling-Surface Company, Buffalo, N. Y. Booklet. Illustrates noteworthy examples of the benefits of Cling-Surface in five prominent railroad shops and gives details of the different installations. A partial list of railroads using this treatment for their shop belts is included.

Motion Pictures.—Essanay Film Mfg. Company, First National Bank Building, Chicago, Ill. Pamphlet. Shows how motion pictures can be employed in connection with industrial processes to obtain a record of the various steps to supplement catalogue work by showing machines in actual operation as well as various lines of goods in process of manufacture.

Reinforced Concrete Construction.—Trussed Concrete Steel Company, Detroit, Mich. Fifth edition of "Kahn System Standards." Is a handbook of reinforced concrete construction dealing with all the various features. All of the Kahn specialties are illustrated and briefly described, and there are a number of views, both interior and exterior, of reinforced concrete structures. Specifications for reinforced concrete construction, an illustrated description of the advantages of it; tables of the comparative cost of reinforced concrete, wood, mill and structural steel construction, and a number of tables of useful information are included. A comprehensive index renders the finding of any subject contained in the 125 pages a comparatively easy matter.

Bearings.—Norma Company of America, 20 Vesey street, New York City. Three bulletins. The first, No. 102, describes the Norma line of annular and double annular ball bearings and a combined annular and ball thrust bearing. The essential features of these bearings are presented, and there are a number of engravings showing applications of them. No. 103 describes roller bearings and combined roller and ball thrust bearings which are of the open, non-adjustable type with cylindrical rollers, and are designed and intended for radial loads only. Bulletin No. 104 is concerned with single and double ball thrust bearings and gives detailed specifications with dimension drawings. As is the case with the other two bulletins, a number of views of applications of the bearings are included.

Electric Motors, Voltage Regulators and Air Brake Equipment.—General Electric Company, Schenectady, N. Y. Four bulletins. The first, No. A4121, superseding No. 4915, is a revision of a bulletin dealing with the type CVC direct-current motors of the commutating pole design. No. A4123, superseding No. 4601B and 4602B, and No. A4129, are given over to the subject of voltage regulators. The first describes an automatic voltage regulator for use in connection with either alternating or direct current generators, while the latter illustrates and describes in considerable detail the pole type of regulator for use on small, single-phase feeders only. No. A4127 describes an automatic air brake equipment designed for use on either single cars or trains of three or more. Cars provided with this equipment can be used as locomotives for switching service and for operating interchangeably with steam railroad cars.

